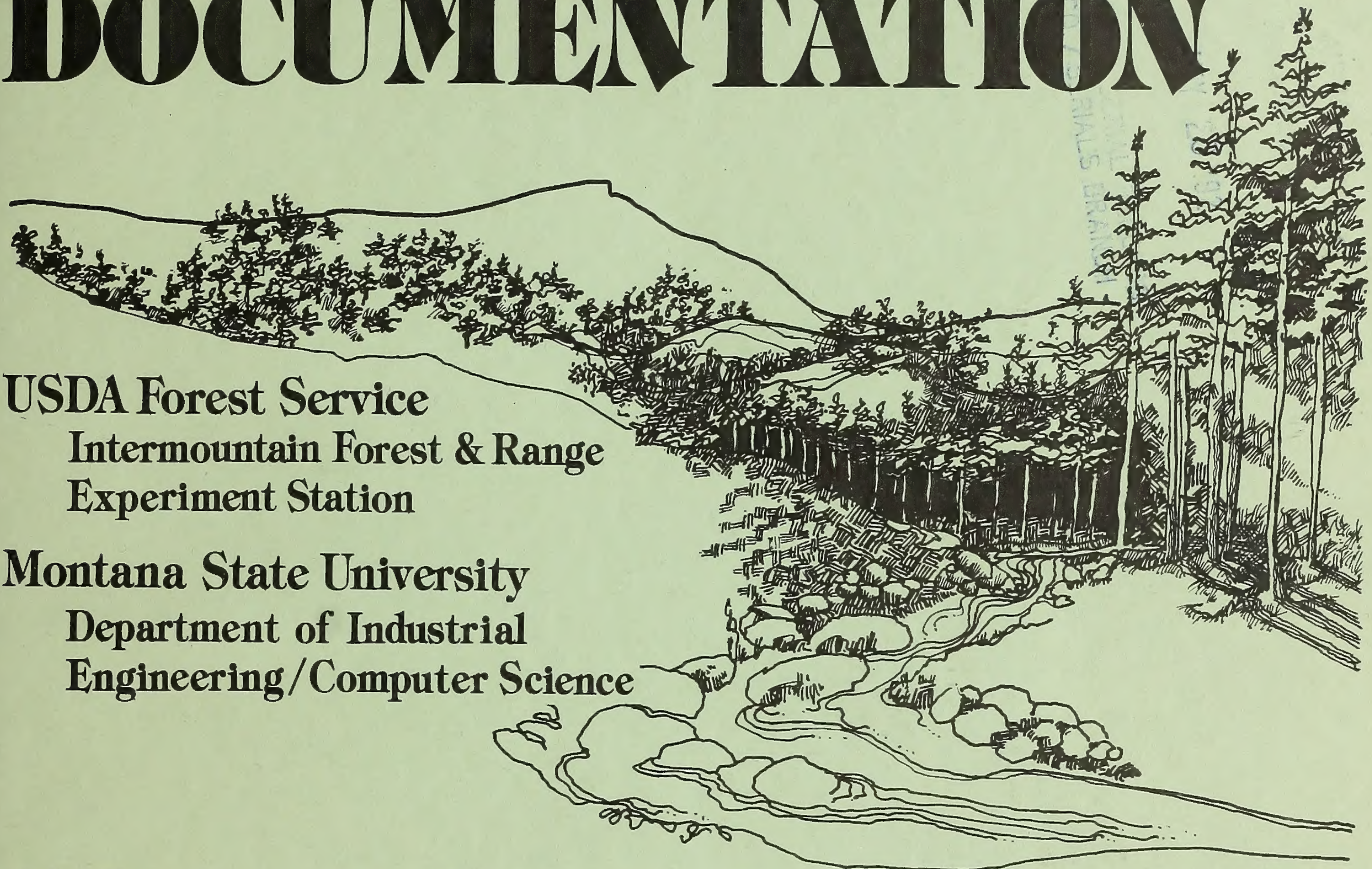
AMPLAN
PROGRAM
DOCUMENTATION



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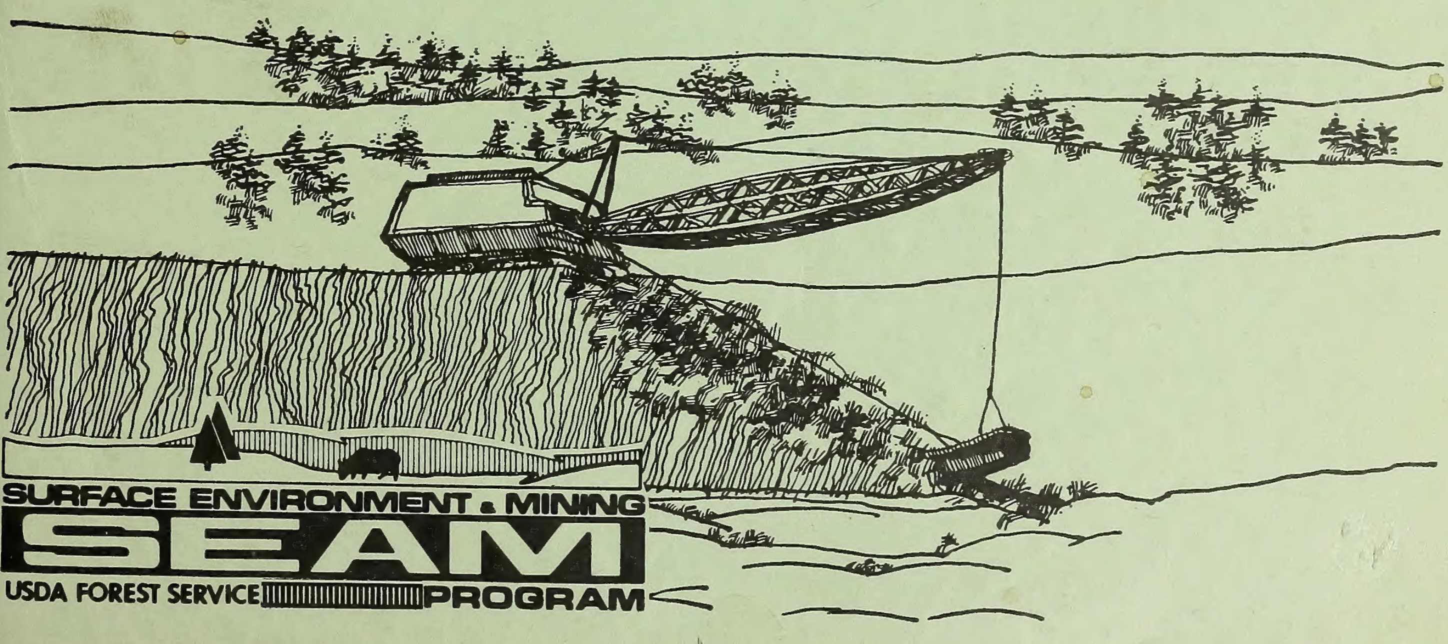
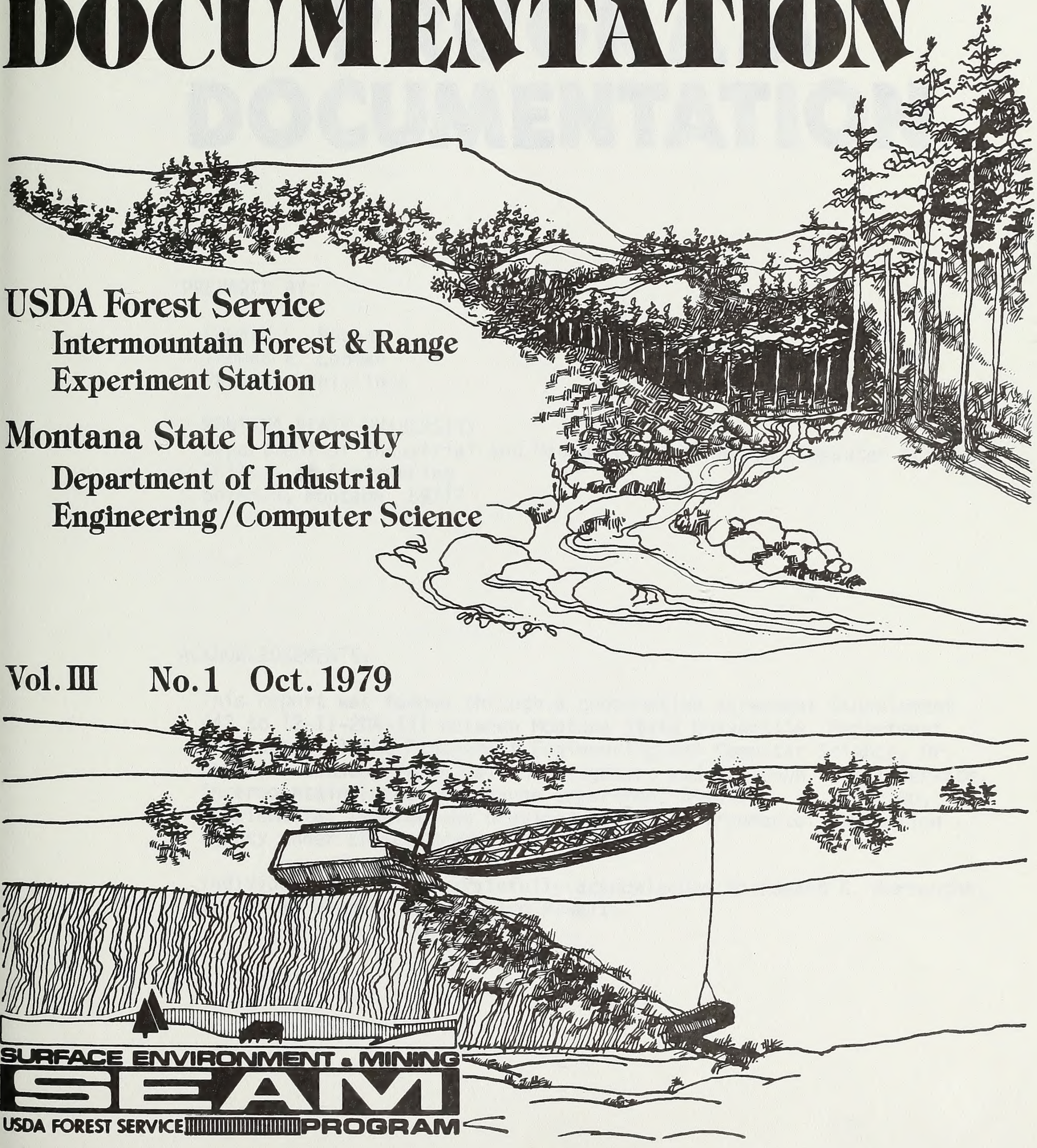
Vol. III No. 1 Oct. 1979



SEAMPLAN

PROGRAM DOCUMENTATION



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Vol. III No. 1 Oct. 1979

SURFACE ENVIRONMENT & MINING
SEAM
USDA FOREST SERVICE PROGRAM

SEAMPLAN

PROGRAM DOCUMENTATION

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GENERAL COMMENTS -- ALL VOLUMES

The Surface Environment and Mine Planning System (SEAMPLAN) reported in three volumes, provides an integrated computerized planning system for evaluating surface coal recovery consistent with minimal impact on environments.

The SEAMPLAN System was developed on a Hewlett-Packard minicomputer using the RTE III operating system in a highly modular software design. Its organization revolves around three functional modules:

1. Data Entry and Review
2. Production Analysis
3. Impact Analysis

Each module is divided into programs combining a user's knowledge gained through interactions with information found in standard data files. In this way an unfamiliar user is quickly provided with a broad range of computing capability.

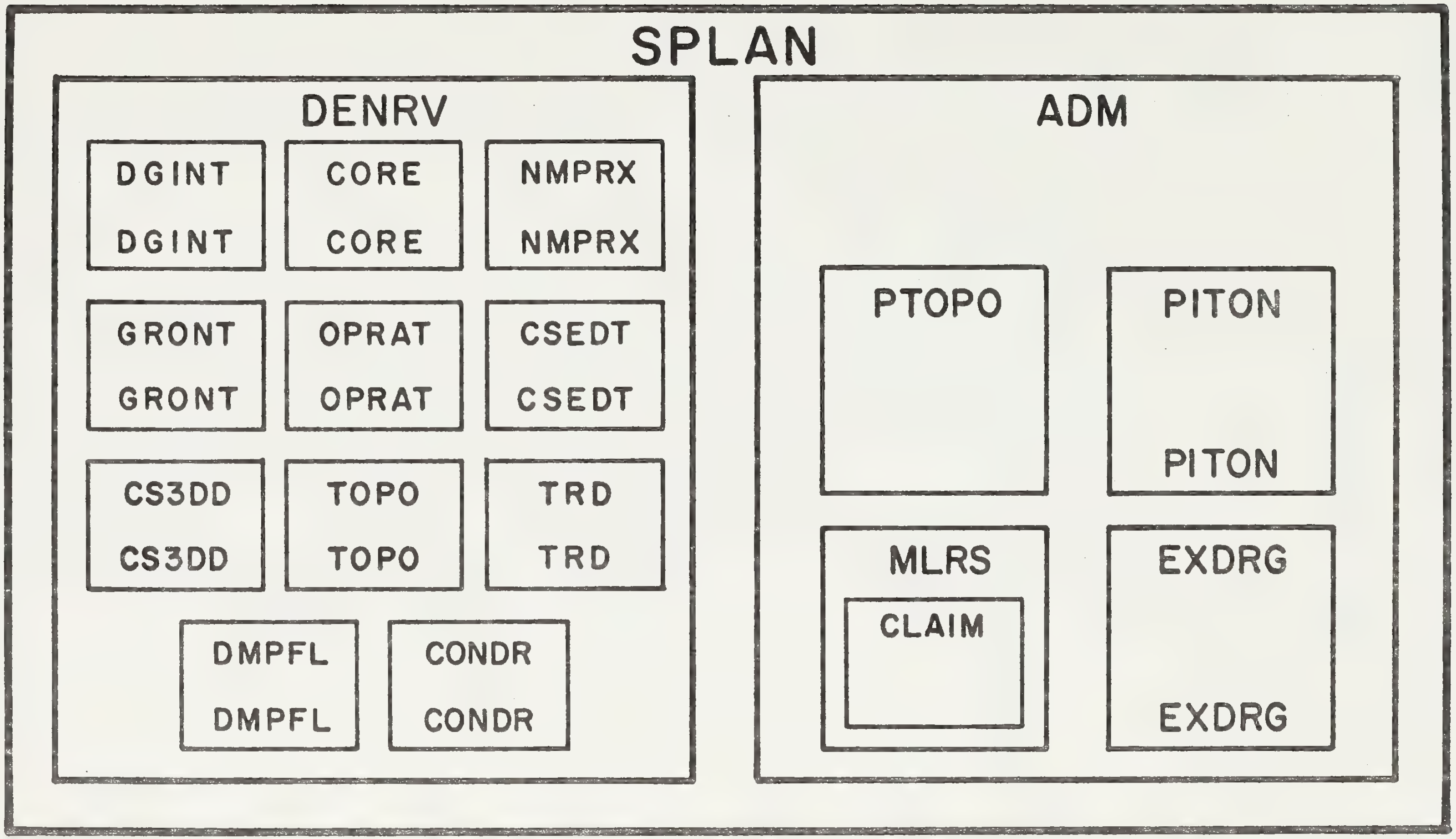
In addition to Roman numeral designation, all three volumes in SEAMPLAN are given Arabic numeral "1". Future reports, which may be new, but related material, or elaborations and other extensions of current material, will be given sequential Arabic numeral designations.

Volume I (OVERVIEW) is a stand alone manual giving a history of surface mining and a sequence of operational events relating to development of a mining plan. It describes acquisition, adaption, and development of applications software necessary for efficient operation. A user is assisted in selecting equipment for setting up a project and applying the programs.

Volume II (USER'S GUIDE) is a stand alone manual giving step-by-step procedures for a manager, engineer, or interested user to successfully apply SEAMPLAN without benefit of selecting and setting up a system or without in-depth knowledge of the mathematical modeling and computational logic internal to it.

GENERAL COMMENTS -- VOLUME III

The major purpose of the PROGRAM DOCUMENTATION is to provide necessary information for SEAMPLAN programs through data descriptions and logical format. Data layout charts present types of program data and how they are input and output. Appendices cover system routines and file types.



PROGRAM DOCUMENTATION GUIDE MAP

* FAMILY INTERRELATIONSHIPS OF MODULE HIERARCHY DESCRIBED IN VOLUME III

FIGURES

DATA ENTRY AND REVIEW

FIGURES (CONTINUED)

Page

PRODUCTION ANALYSIS

FIGURES (CONTINUED)

Page

TABLES

DATA ENTRY AND REVIEW

PRODUCTION ANALYSIS

TABLES (CONTINUED)

PRODUCTION ANALYSIS

REFERENCES

DATA ENTRY AND REVIEW

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9. Scott, M. Douglas. Computerized Reclamation Planning System for Northern Great Plains Surface Coal Mines, "User's Databook," Office of Resource and Development, MSU for U.S. Forest Service. Intermountain Forest and Range Experiment Station, Surface Environment and Mining (SEAM) Program. October 1979.

SEAMPLAN is developed in a tightly structured format with modularization occurring at three levels (Figure 1):

1. Data Entry & Review
2. Production Analysis
3. Impact Analysis.*

Within the first two levels (functional modules) are sub modules, each accomplishing a specific task previously selected by user. Each module has been decomposed into one or more program segments since the complete SEAMPLAN overflows core on the Hewlett-Packard, RTE III.

Since the complete SEAMPLAN package overflows core, swapping must take place between program segments. The parameters needed between programs are passed through a COMMON block.

The swapping technique used writes the COMMON block of the father program out to the disc. The son program is then scheduled (2 - Data Entry & Review), retrieving the COMMON area from the disc and continuing son program execution.

Upon completion of the son program, the COMMON area is then written out to the disc again. The father program is then rescheduled. At this point the COMMON area is read back from the disc and execution proceeds from the point of transfer.

Volume III is organized along lines of the control hierarchy inherant in SEAMPLAN. Individual routines are described in the main body and summarized in Appendix B with data sheets. Table 1 provides a cross-reference for program descriptions and data sheets.

---

* Although impact analysis is reserved as a functional module it is an empty set and requires no discussion for this publication.

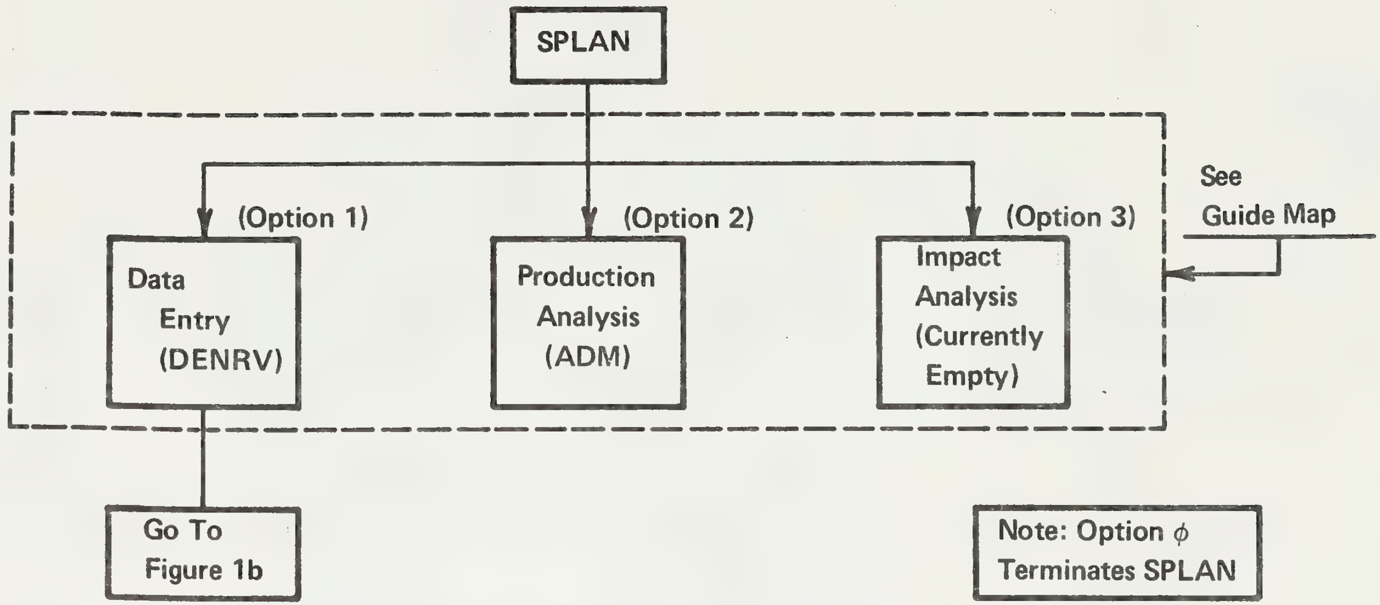


Figure 1a.—SEAMPLAN Modules

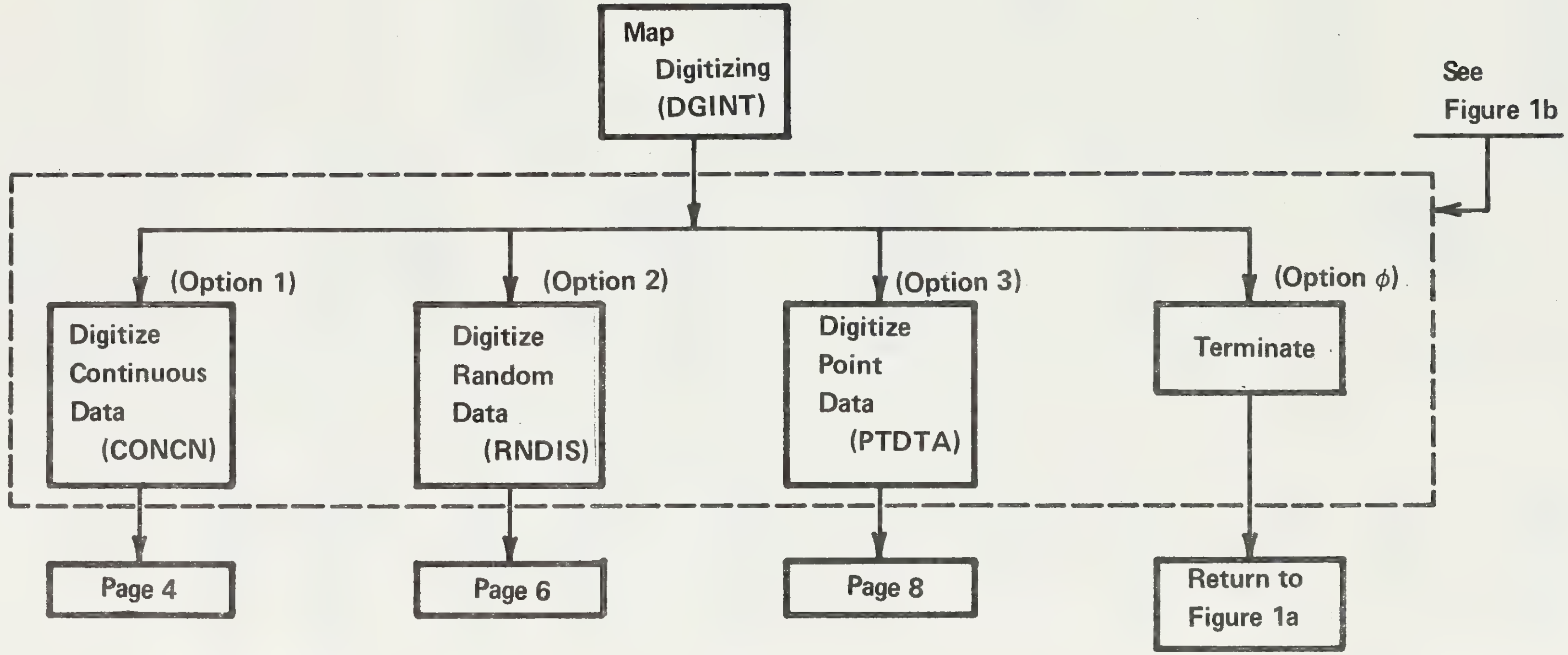


Figure 1c.—SEAMPLAN Modules

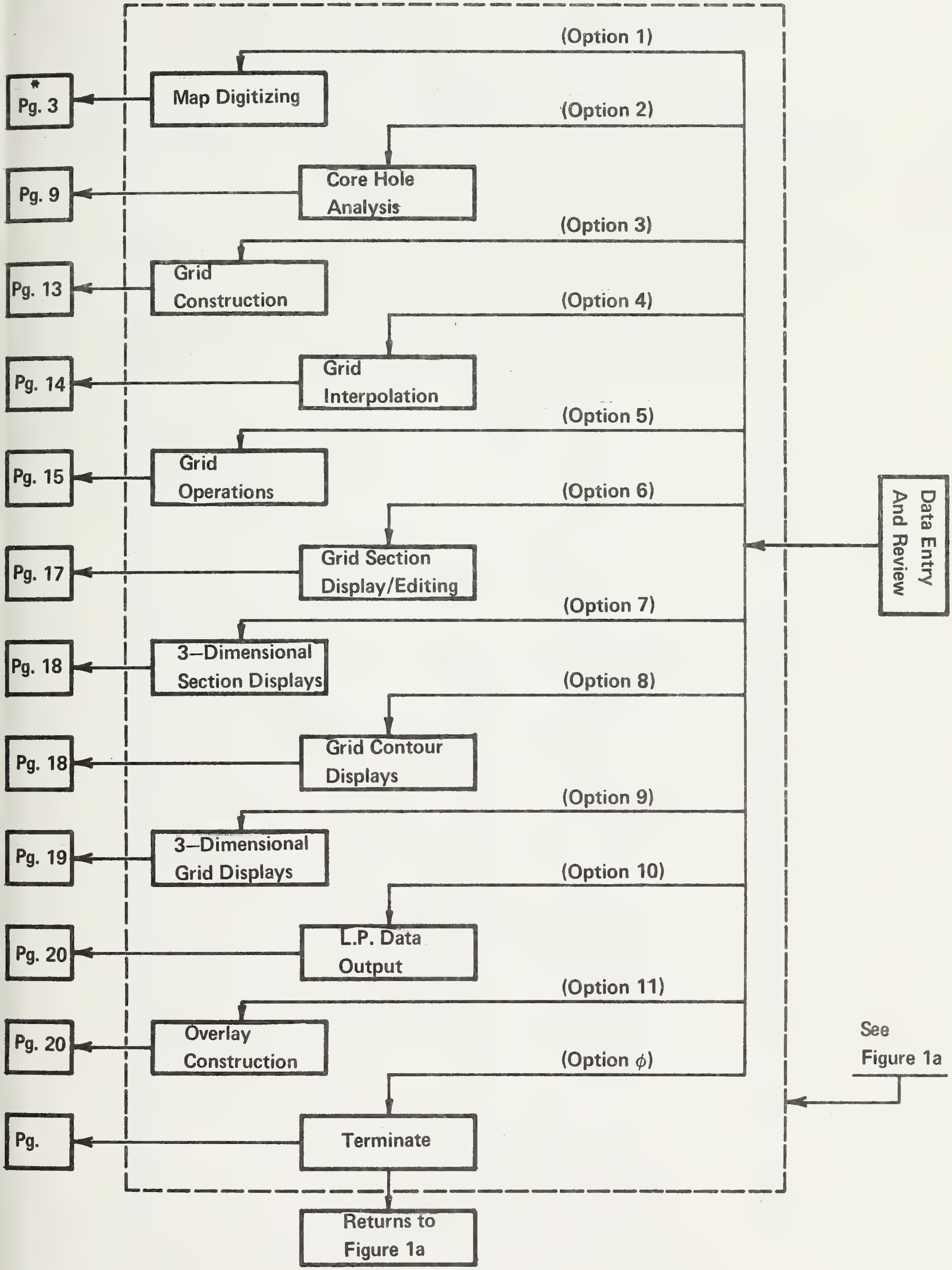


Figure 1b—SEAMPLAN
Modules (continued)

*Refer to Vol. II for further info on these programs

Table 1. -- Cross-Reference (Programs/Data Sheets).

PROGRAM NAME (Subroutine)	PROGRAM DESCRIPTION PAGE	DATA SHEET PAGE (Appendix B)
ADM	42	1
ADMUI	44	2
ADMX	43	3
AHAT	62	4
ANALY	55	5
AOBR		6
BCORD		7
BDATA	45	8
BDGAA	45	9
BFILL		10
BFL		11
BFLF		12
BF2	19	13
BHEEL		14
BNR		15
BNRF		16
BOOM		17
BOX	29	18
BPWR		19
BTDL	47	20
BUCKT		21
BUILD	19	22
CFINZ	44	23
CHS	46	24
CMP7	65	25
CNSTR	56	26
CNTRG	29	27
CNTUR	39	28
CODER	25	29
CONCN	4	30
CONDR	37	31
CORE	15	32
COREL	17	33
CPF	47	34
CRAMR	52	35
CROSS	53	36
CSDRW	24	37
CSEDO	24	38
CSEDT	23	39
CSEOT	25	40
CS3DD	26	41
DATA		42
DBE	45	43
DENRV	2	44
DGINT	3	45
DIAGR	62	46
DIG		47

Table 1. -- (Continued).

PROGRAM NAME (Subroutine)	PROGRAM DESCRIPTION PAGE	DATA SHEET PAGE (Appendix B)
DLINZ	44	48
DLS	47	49
DLS2	48	50
DMODS	60	51
DMPFL	37	52
DPFIO	58	53
DPLOT	53	54
DRAG		55
DRAGL		56
DRAWM	14	57
DRNG	51	58
DRSPL	65	59
DRWPL	63	60
DRWXS	63	61
DSGNC	65	62
DSPAC		63
DSPDS		64
DSPOD		65
DSPPD		66
DSPSQ		67
DSRCE		68
DSSAC		69
DTOT		70
DUMP		71
EBNCH	64	72
EFC	76	73
EXDRG		74
FCNOD		75
FDLQ	48	76
FILBF	33	77
FLEX	57	78
FRAM1	27	79
FRAMR	36	80
FYB23	62	81
GAA	47	82
GETD	59	83
GRCNT	20	84
GRDIN	37	85
GRDNT	22	86
GRFF	18	87
HUB		88
INAM		89
INIT1	61	90
INPT	19	91
INTER	18	92
INTT		93
LINE	52	94

Table 1. -- (Continued).

PROGRAM NAME (Subroutine)	PROGRAM DESCRIPTION PAGE	DATA SHEET PAGE (Appendix B)
LRS	46	95
LUOS	75	96
MAKFL	21	97
MAPIO	39	98
MLRS	70	99
MODL	59	100
MOD1	60	101
MOD2	61	102
MOVE		103
MUSG		104
NH	68	105
NINT		106
NINT		107
NMPRX	21	108
OBR		109
OBRF		110
OBRI		111
OBS		112
OPDFM		113
OPDUP		114
OPRAT	22	115
OPSEQ		116
OTLN	14	117
OUTLN	53	118
PFILE		119
PINIT		120
PITDN	54	121
PITDP	58	122
PLTCN	30	123
PLT3D	33	124
PNTDR	10	125
PRNPD		126
PROPD		127
PTDTA	8	128
PTFLS	53	129
PTLOT	50	130
PTOPO	48	131
PUTNH	68	132
QBE	46	133
RAN		134
RCLAM	74	135
RDGRD	27	136
REDRW	51	137
RETRN	59	138
RNDDR	7	139
RNDIS	6	140
RNITZ		141

Table 1. -- (Continued).

PROGRAM NAME (Subroutine)	PROGRAM DESCRIPTION PAGE	DATA SHEET PAGE (Appendix B)
ROTAT		142
RPT	44	143
RSPON	56	144
RTHTA		145
RTRVL	17	146
SCALE	13	147
SFILL		148
SHADE		149
SHGT		150
SORT	18	151
SPCNF	62	152
SPEED		153
SPILE		154
SPRED		155
SQUAR	12	156
STUP3	36	157
SVOL		158
SWCON	6	159
SWGA		160
SWTCH		161
SYMED	10	162
TIME	62	163
TIME1	61	164
TOPO	27	165
TPWR		166
TRACK		167
TRD	30	168
UPCAS		169
UPDAT	26	170
UPDAT		171
UPFLG		172
UPSET		173
USER	56	174
VERB		175
WDAT		176
WRHDR		177
XLINE	18	178
XSEC	16	179
ZOOM	29	180

GENERAL

Figure 2 shows the broad SEAMPLAN program tree with submodules under control of the data entry and review executive. These modules will be described subsequently. Each represents a logical program (subroutine) grouping and takes the name of a controlling program or executive.

SWAPPING PROCEDURES

A calling program sets up scheduling needed to swap in a called program. The calling program then calls a subroutine to finish swapping. The swapping subroutine first writes the COMMON block to disc. The called program swaps into main memory. When the called program finishes, control returns to the swapping subroutine, which retrieves the COMMON block from disc returning control to calling program. The calling program now releases called program, whereupon execution continues sequentially. Details for disc read and writes, program scheduling, and others are given in executive call descriptions.

PROGRAM DENRV

DENRV (data entry and review functional module executive program) is swapped by SPLAN after which a menu is placed on the screen listing user options. Following input of an option number by the user, branching is accomplished to the correct block of code for implementation of various options. All options, with the exceptions of contour display and edit, result in program swapping to perform selected functions. Descriptions are given in later sections for every DENRV routine. Other information for DENRV may be found in Appendix B.

```
Program MAIN
    •
    •
    •
Schedule Called Program
Call SUB (Called Program Name)
Release Called Program
    •
    •
    •
END
```

```
Subroutine SUB (Called Program Name)
    •
    •
    •
Write COMMON To Disk
Swap In Called Program
Read COMMON From Disk
RETURN
END
```

Figure 2.—Swapping Sequences.

SUB-MODULES/PROGRAM DESCRIPTIONS

DGINT MODULE

The programs and subroutines comprising the DGINT module provide the user of SEAMPLAN with a fairly complete digitizing data entry capability. These routines were coded entirely at MSU, and rely on the Tektronix Tablet I/O utility routine.

There are three basic types of data handled by this module: 1) continuous, 2) random 3) point. Continuous (vectored) data is digitized, stored, and displayed as a series of points representing connected vectors. Examples include contours, roads and property boundaries. Random data, as defined in SEAMPLAN, are continuous data stored as X, Y, Z (location, elevation) triplets, where X, Y values (location) are randomly located within a map area. X, Y points may be used to construct uniform grids for display purposes. Point data identify and locate map or land features existing only at discrete points in the map area. Examples are houses, archealogical sites, and campgrounds.

In addition to programs and routines that aid in digitizing each of these data types, there are several subroutines shared among programs in the module. This is possible since a standard, consistant, method is used for several functions common to all, such as locating a map on the digitizing tablet. Table 2 summarizes the program segments, sub-routines, and their functions for the DGINT module.

Program DGINT

This is an option of data entry and review whose purpose is to control access to the three types of digitizing inputs mentioned:

1. Digitize continuous data (CONCN)
2. Digitize random data (RNDIS)
3. Digitize point data (PTDTA).

DGINT is swapped into memory by selecting option 1 of DENRV. Selection of option 9 returns control to DENRV.

Table 2. -- DGINT Module Program Segments

NAME	SUBROUTINES	USE
DGINT	-	Digitizing Control
CONCN	SQUAR, SCALE, OTLN, UPDAT, SWCON	Continuous data digitizing
CONDR	MAPFO, CNTUR	Continuous data drawing
RNDIS	SQUAR, SCALE, OTLN	Random (X, Y, Z) digitization of continuous data
RNDDR	DRAWM	Random data drawing
PTDTA	SQUAR, SCALE, OTLN	Point data digitizing (with symbols)
PNTDR	DRAWM	Draw point data and symbols
SYMED	SCALE, SQUAR, OTLN	Edit point data symbols

Program CONCN

Program CONCN is one of the options of DGINT, whose purpose is to digitize continuous data.

Table 3. -- CONCN File Header

WORD	INFORMATION
1	file type (4)
2-3	minimum geographical X value
4-5	minimum geographical Y value
6-7	maximum geographical X value
8-9	maximum geographical Y value
10-11	contour interval
12-13	minimum elevation
14-15	maximum elevation
16-25	job name

Table 4. -- CONCN Record Header

WORD	INFORMATION
1	ICON - continuation flag
	(1) - record is a continuation
	(2) - start a new record
2	ICT - record type
	(1) - contour
	(2) - road
	(3) - water stream
	(4) - boundary
	(5) - others
3	IELEV - elevation of contour
	(1 - for all other record types)
4	ICPTS - number of X, Y coordinate pairs in the record (maximum of 50 per record)
5 (ICPTS *2) + 4	X, Y coordinate pairs

Positioning of the map is done through subroutine SQUAR. All points are scaled through subroutine SCALE and all map replicas shown on the screen are accomplished by subroutine OTLN exactly as they appear on the digitizing tablet.

The user is required to enter a data file name and a cartridge number for that data file. A job name and constant contour interval must be entered.

The constant contour interval is an integer value whose multiples determine which contours are to be drawn. For example, a value of 1 for the constant contour interval would insure that all contours are drawn, since every elevation would be a multiple of 1.

The user is also asked to input a scale factor for the map, and values for the origin, which is assumed to be the lower left hand corner of the map .

The following options are available through keyboard entry when digitizing:

(E) - Terminates current record being digitized. The program writes out the record up to the point where an "E" is entered. The user may then begin digitizing another record of the same type.

For example, if the user had been digitizing a road, he would then be able to digitize a different road.

(T) - Terminates the current record built thus far and writes this record to a record file. The user then enters a new record type.

(S) - Shows the file to date.

(Q) - Terminates the current file and returns control to DGINT.

All values used in the program and in the COMMON block are described in the program.

Control is returned to DGINT by either entering a "7" or "0" through the record type options, or by entering a "Q" through the operating instructions. See Figure 3.

Subroutine SWCON

Subroutine SWCON is designated to swap in the continuous data drawing routine (CONDR).

RTE-III exec calls are used to write the COMMON block out the disc, swap in the drawing routines, and to retrieve the COMMON block from the disc. See Appendix D.

Program RNDIS

Program RNDIS is one of the options of DGINT (option 2). The program RNDIS is designed to digitize random data.

The file created by RNDIS is an ASCII file with the format shown in Table 5.

Table 5. -- RNDIS Data File

RECORD	INFORMATION
1	NZS - the number of elevations for each coordinate X, Y pair. (RNDIS allows only one elevation for each coordinate X, Y pair.) NPTS - the number of X, Y, Z records in the file. (0 indicates the total number of X, Y, Z records is unknown).
2 - n + 1	X, Y, Z
n + 2	Contains constants of 1.E36 to indicate an end of file

Queries For Initialization–
Find Positioning Of The Map
Do While Response ≠ ϕ, or 7

Input Option From Record
Type Options Menu (1, 2, . . ., 6)
If (response = 1, 2, . . ., 5), do

If (response = 1) Input Elevation
Digitize Points On Record
Input Response From Operating
Instructions Menu (E, T, S, Q)
Write the record out to
the file

If (response = 'E') Do
Continue With Same
Record Type

If (Response = 'T') Do
Continue

If (Response = 'S') Do
Show The Map To Date
Continue

If (Response = 'Q') Terminate II

Show The Map To Date
Continue

TERMINATE II

Figure 3.–Flowchart for Program CONCN.

Subroutine SQUAR handles positioning of the map, Subroutine SCALE converts tablet coordinates to geographical coordinates. Subroutine OTLN shows the positioning of the map on the digitizing tablet.

The user is asked to supply the program with a file name and cartridge number. Later, the user also supplies a scale factor for the map and the geographical coordinates of the origin, which is assumed to be in the lower left hand corner of the map.

The following options are available to the user:

(D) - Delete the last X, Y coordinate entered. Only the last point can be deleted. There is a one point buffer that is used to eliminate the need for large arrays to hold the X, Y coordinates and their respective elevations. When a new point is entered, the point currently in the buffer is written to the file and the new point is written to the buffer. Because of this buffer, only the last point entered can be deleted.

(E) - Terminates the current elevation and allows the user to enter a new elevation.

(P) - Purges the file currently being built and returns control to DGINT.

(S) - Swaps in the program RNDDR which shows the map up to the time it is called. Upon return from RNDDR the user may add more points to the file.

(Q) - Closes the current file after having written constants of 1.E36 to the last record of the file. Control is then returned to DGINT.

* After the user has finished building this ASCII file, a binary file is built first by using data entry and review option 3 and then converting the binary file to a grid file, which is the only file used in the SPLAN display programs.

Control is returned to DGINT either by entering an elevation value of -999, or by entering a "P" or "Q" during the operating instructions.

All variables used in RNDIS and in its COMMON block are described within the program.

<u>Program RNDDR</u>

Program RNDDR is swapped into memory by entering an "S" during the operating instructions of program RNDIS. The purpose of RNDDR is to show the map to date currently being built by RNDIS.

Subroutine DRAWM draws an outline of the map on the screen. It draws this outline in the largest possible area while avoiding distortion.

Some useful information is displayed at the left hand margin of the screen. It includes such things as the file name, minimum and maximum X and Y geographical coordinates, elevations, and a grid interval.

The points are then placed on the map, designated by a small rectangle and labeled 1, 2, 3, ...

The user is given the option of whether or not he wishes to get a line printer listing of pertinent information. This listing includes all of the information displayed at the left hand margin of the screen and geographical coordinates for each point along with their respective elevations. A summary of minimum and maximum geographical coordinates and elevations is printed at the end of the output, which is very useful in editing, verifying data, and creating binary and grid files.

At the end of these displays, control is returned to RNDIS. Additional data may then be added to the ASCII file.

All variables used in the program and in the COMMON block are described within the program.

Program PTDTA

Program PTDTA is swapped in by selecting option 3 of DGINT. PTDTA handles the input of point or symbolic data.

The files created by PTDTA are binary-random-access files which contain information in the format shown in Tables 6 and 7.

Table 6. -- PTDTA File Header

WORD	INFORMATION
1	Type of file (7)
2-3	minimum geographical X value
4-5	minimum geographical Y value
6-7	maximum geographical X value
8-9	maximum geographical Y value
10-12	symbol table name (the symbol table contains the masters for the symbols along with their general descriptions).
13	Cartridge number where the symbol table file is located.
14	Job name or a general description of the file being created.

Table 7. -- PTDTA Record Header

WORD	INFORMATION
1	symbol number
2-3	geographical X coordinate of the symbol
4-5	geographical Y coordinate of the symbol
6-15	symbol description

Subroutine SQUAR locates the map on the digitizing tablet. Subroutine SCALE accomplishes all conversion and scaling from tablet coordinates to geographical coordinates. Subroutine OTLN draws an outline of the map as it appears on the tablet.

When creating a new file, the user enters a file name and a cartridge number, which indicates where this file resides. Similarly, a symbol table name is entered with its cartridge designating location. The symbol table need not exist; it may be created or edited through option 3 of the point data options. The user must also enter a scale factor and geographical coordinates for the map. Map origin is assumed to be the lower left hand corner of the map.

The options available to the user are:

1. Add a symbol to the map. The user is asked which symbol to add. The program will check to see if a symbol actually exists at that location in the symbol table. If a symbol exists, then the general symbol identification will be displayed for verification. The user may now enter an identification for the point to be digitized and input as many occurrences of that symbol as he desires. After each occurrence, the symbol and other pertinent information will be displayed for verification. This includes symbol table name, symbol number, a general symbol description, and point identification.

2. This option swaps program PNTDR, which shows the map to date. Upon completion, control returns to PTDTA.

3. This option swaps program SYMED, which creates or edits the symbol table file and should always be called first to verify that a symbol table exists. Upon completion, control returns to PTDTA.

4. Purges file currently being built. Control returns to DGINT.

0. Terminates PTDTA and control returns to DGINT.

All variables in the program and those used in the COMMON block are described within the program and in Appendix B.

Program PNTDR

Program PNTDR is swapped in by selecting option 2 of PTDTA. PNTDR draws the maps created by PTDTA (point data).

Subroutine DRAWM draws a replica of the map. The user may show all symbols which have been digitized at the point of the call or specify up to ten different symbol numbers he wishes to display.

The user can then specify by using the cursors, which map areas are to be checked to display each of these symbols. The user first positions the cursors to the lower left hand corner of the desired area, then positions the cursors to the upper right hand corner of the desired area. He may specify a different area for each of the symbols. An input of 0 terminates this process.

Another replica of the map is then drawn. All pertinent symbols are placed on the map. Each of these symbols is labeled as before with 1, 2, 3, ...

Useful information is then written at the left hand margin of the screen, which contains a file description, file name, symbol table name, minimum and maximum geographical X and Y coordinates, and a grid interval.

The user may also obtain a line printer listing of symbol identification and a general symbol description of all displayed symbols. This listing also contains all information displayed at the left hand margin of the screen.

The user may request another drawing. If so, the process begins over again. If the user does not request another drawing, control returns to program PTDTA, where more data may be added to the files.

All variables used in the program and in the COMMON block are described within the program.

Program SYMED

Program SYMED is swapped in by selecting option 3 of PTDTA. SYMED creates or edits the symbol table used by PTDTA and PNTDR.

System routine DAFMP creates files used for symbol tables. It also creates a randomly accessed-fixed length-binary file with a record format shown in Table 8.

Table 8. -- SYMED File Data

WORD	INFORMATION
1	symbol number
2-11	symbol description
12-n	X, Y pairs that are connected to form the symbol. The constant -999.9 indicates there are no more X, Y pairs for this symbol. (The symbol can contain no more than ten X, Y pairs.)

Subroutine SQUAR is used to locate the positioning of the map on the digitizing tablet. Subroutine SCALE does all of the scaling. The symbol scales in such a way that it is contained within an area where both the X and Y axis go from 0 to 1.

The following options are available to the user:

1. Enter a new symbol. When entering a new symbol the user is asked to input a symbol number (1-50) and a general symbol description. He may then use the CRT crosshairs to digitize symbol vectors. An input of "Q" indicates he is finished digitizing the vectors of the symbol. An input of "R" purges the symbol currently being built. When the user is finished digitizing the symbol, SYMED checks to see whether or not a symbol already exists at that location. If no symbol exists, the symbol is written to the file. If a symbol already exists at the specified location, the user has three options:

   a. The user can move the symbol to a new location. If one exists, SYMED will display the first available location.

   b. The user may replace the old symbol with the new symbol.

   c. The user may decide not to add the symbol to the table at all.

2. Display a single symbol. The symbol is displayed on the screen along with its symbol number and general symbol identification.

3. Display the whole table. The symbols, symbol numbers, and general symbol identification are displayed five at a time on the screen.

4. Display the symbol table name.

5. Purge the symbol table. Returns control to PTDTA.

0. Terminate. Control returns to PTDTA.

Caution should be used when replacing an old symbol with a new symbol. The files created by PTDTA contain only a pointer to the master. If the master is changed the file now points to the new master.

Variables used in the program and in the COMMON block are described within the program and in Appendix B.

<u>Subroutine SQUAR</u>

Subroutine SQUAR is called by virtually all the digitizing input routines. It is used to find the position of the map on the digitizing tablet.

To locate the map subroutine SQUAR needs three points, which are:

1. The location of the lower left hand corner of the map.
2. The location of the lower right hand corner of the map.
3. The location of a point along the upper edge of the map.

Using the first two points, the subroutine determines the range of the X-axis and the equation of the line used to represent the X-axis.

A perpendicular is then dropped from the point on the upper edge of the map to the X-axis. The range of the Y-axis is calculated by determining the length of this perpendicular.

The angle of rotation for the map is calculated by finding the angle whose tangent is the change in Y of the X-axis divided by the change in X of the X-axis. If the map is rotated in a clockwise direction this is the angle of rotation, however, if the map is rotated in a counter-clockwise direction the angle of rotation is the negation of this angle.

The parameter required from the calling programs is:

IC - flag to indicate whether or not an outline of the map as it appears on the tablet should be drawn. (1 - indicates an outline of the map should be drawn, and subroutine OTLN is called.)

The parameters returned to the calling program are:

XMLL, YMLL - tablet coordinates of the lower left hand corner of the map.

XMLR, YMLR - tablet coordinates of the lower right hand corner of the map.

DX4, DY4 - tablet coordinates of the upper left hand corner of the map

DXM - absolute tablet distance of the X-axis of the map.

DYM - absolute tablet distance of the Y-axis of the map.

ROANG - the angle of rotation for the map relative to the X-axis of the tablet.

Subroutine SCALE

Subroutine SCALE is designed to be used by all the digitizing input routines. It is used to convert the points entered from digitizing tablet coordinates to geographical coordinates.

The steps involved in this process are:

1. Translate
2. Rotate
3. Scale.

The first step involved in this conversion is to translate the point. This is done by translating the origin of the map (assumed to be the lower left hand corner of the map) to the tablet origin.

The second step involved in this conversion is to calculate the rotation of the point. The equations for this rotation are:

$$X^{y'} = X * \cos(\emptyset) + Y * \sin(\emptyset)$$

$$Y^{x'} = -X * \sin(\emptyset) + Y * \cos(\emptyset)$$

where $\emptyset$ is the angle of rotation.

The final step in the conversion process is to scale the point. The equations for this are:

$$X' = XMIN + (X/100 * SCL)$$

$$Y' = YMIN + (Y/100 * SCL)$$

where:

X', Y' - are the geographical coordinates of the map,
XMIN, YMIN - are the geographical origins of the map.
X, Y - are the absolute distances of the point from the origin.
100 - conversion factor (on this particular tablet there are approximately 100 points per inch).
SCL - scale factors of the map (units/inch)

The parameters needed from the calling programs are:

XMIN - geographical X coordinate of the map origin
YMIN - geographical Y coordinate of the map origin
XMAX - maximum geographical X coordinate of the map
YMAX - maximum geographical Y coordinate of the map
ROTAN - the angle of rotation for the map with respect to the X-axis of the digitizing tablet
XMLL - the tablet X coordinate of the map origin
YMLL - the tablet Y coordinate of the map origin
IX - the tablet X coordinate of the point to be scaled
IY - the tablet Y coordinate of the point to be scaled
SCL - the scale factor of the map.

**Translate Point (1X, 1Y) From With
Respect To Map Origin (XMLL, YMLL)
To Respect With Tablet Origin (0, 0)
(Fig. 1) **

X1 = 1X – XMLL
Y1 = 1Y – YMLL

**Rotate Point (X1, Y1) From Map
Axis To Tablet Axis (Fig. 5)

X2 = X1 * COS (ROTAN) + Y1 * SIN (ROTAN)
Y2 = –X1 * SIN (ROTAN) + Y1 * COS (ROTAN)

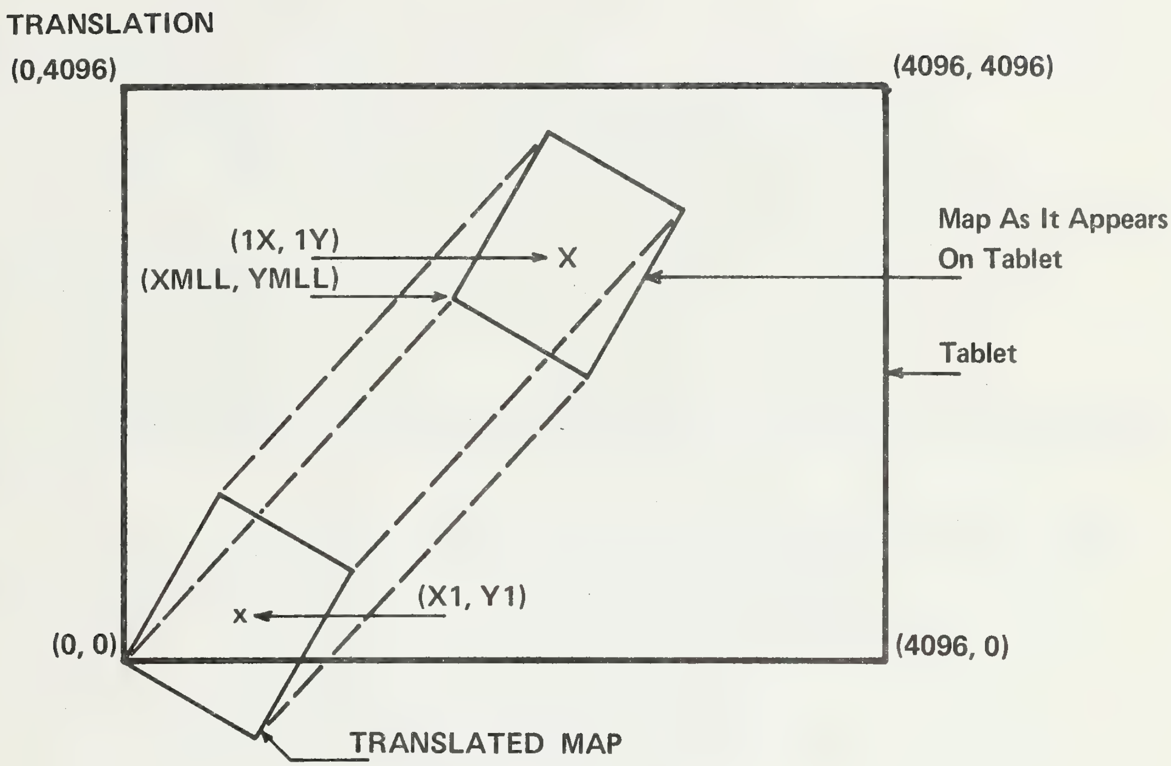
**Scale The Point (X2, Y2) To Be
Consistent With Geographical
Coordinates **

X = minimum geographical X +
(X2/pts/inch on tablet*
the scale factor of the map)

Y = minimum geographical Y +
(y2/pts/inch on tablet *
the scale factor of the map)

RETURN

Figure 4.—Flowchart for Subroutine SCALE



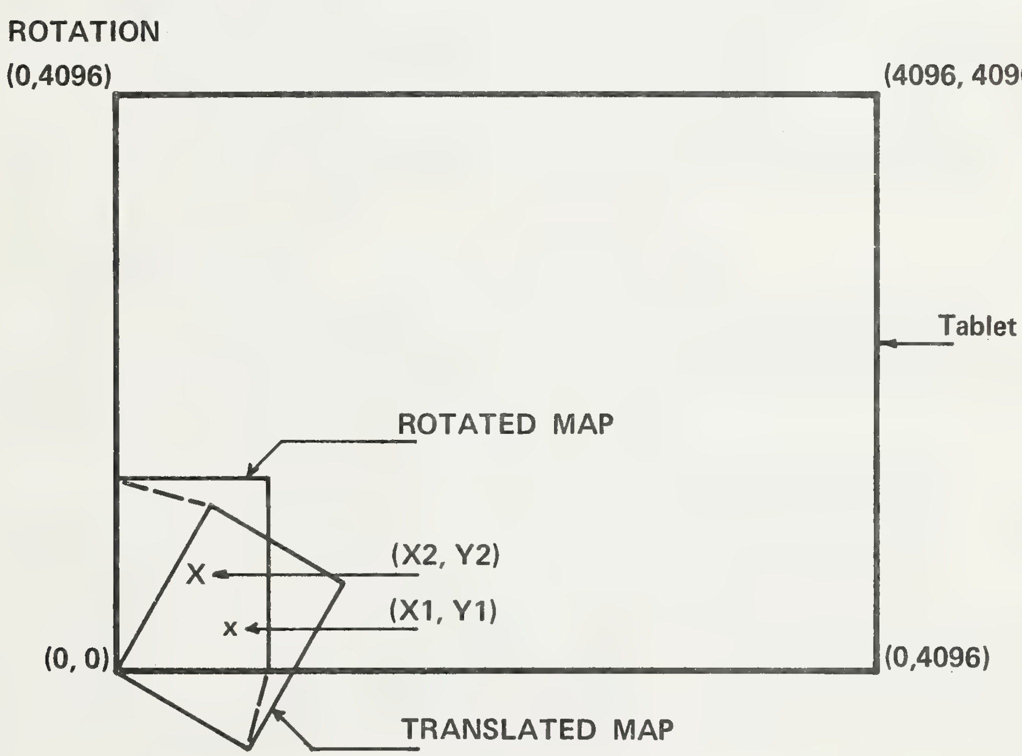


Figure 5—Translation & Rotation of Maps of Digitizing Board

The parameters returned by SCALE are:

X - the geographical X coordinate of the scaled point
Y - the geographical Y coordinate of the scaled point
IERR - error code of a -9 is returned if the point scaled is not within the boundaries of the map.

Upon return to the calling program none of the parameters from the calling program have been changed.

Subroutine OTLN

Subroutine OTLN is designed to be used by all digitizing input routines. It is designed to draw an outline of the map as it appears on the digitizing tablet.

This is accomplished by taking the tablet coordinates of three corners of the map and dividing these by four. The division by four is necessary since there are four tablet points for each screen point.

The three corners of the map used are:

1. The lower left hand corner
2. The lower right hand corner
3. The upper left hand corner.

The fourth corner of the map is calculated using the other three.

The parameters needed from the calling program are:

XMLL, YMLL - the tablet coordinates of the lower left hand corner of the map
XMLR, YMLR - the tablet coordinates of the lower right hand corner of the map
DX4, DY4 - the tablet coordinates of the upper left hand corner of the map.

Subroutine DRAWM

Subroutine DRAWM is designed to be used by the digitizing output routines. It is designed to sketch an outline of the map, along with labeling the axis, in the biggest allowable screen area. This is done in such a way as to avoid any distortion of the map.

The origin of the map is located at the screen coordinates (250, 30). The lengths of the axis on the screen are determined from the geographical lengths of the axis. If the geographical length of the X-axis is greater than the geographical length of the Y-axis then the length of the X-axis is set to 750 and the Y-axis is scaled. This scaling is accomplished by calculating the proportion of the geographical Y-axis to the geographical X-axis. The X-axis is set to the value of 750 because the screen viewing area is 1,000 by 750. However, if the geographical Y-axis has a greater length than that of the geographical X-axis, then the length of the Y-axis is set to

720 and the length of the X-axis is scaled. This scaling is accomplished by calculating the proportion of the geographical X-axis to the geographical Y-axis.

An outline of the map is then drawn on the screen. Tick marks are then inserted and labeled on both the X and Y axis. The interval used for placing these tick marks on the maps is calculated by dividing the length of the longest geographical axis by ten.

The left hand margin of the screen is used for outputing useful information.

The following parameters are needed from the calling programs:

XMIN, YMIN - the geographical coordinates of the origin of the map.

XMAX, YMAX - the maximum geographical coordinates of the map.

The following parameters are returned to the calling programs:

GRINT - the grid interval at which the tick marks are placed.
MXS - the length of the X-axis in screen coordinates.
MYS - the length of the Y-axis in screen coordinates.

CORE MODULE

The programs and subroutines comprising the CORE module of SEAMPLAN provides the user with a method of evaluating data from corehole samples in an efficient and useful form for identifying surfaces for later reclamation use.

This module performs three basic functions: (1) boundary identification, (2) correlation, (3) and presentation of a subset of coreholes for analysis.

Boundary identification consists of defining a critical value for all the coreholes. This may be done by the user or by using a default value. Boundary identification may also be used to locate specific parameter boundaries by aggregating the adjacent sampling intervals in which there occurred a common value above the critical level for the parameter.

The correlation function provides continuous surface contour displays for the user to analyze bed and formation boundaries. The continuous surface contour displays are generated by connecting the boundaries between selected holes to provide random points.

The analysis of a subset of coreholes generates contoured cross-section displays of specified coreholes and parameters. These displays allow the user to define specific beds and boundaries through the use of the Tektronix 4014 graphics terminal.

In addition to the programs and subroutines actually utilized by the CORE module of SEAMPLAN there exists a collection of programs to convert raw corehole data to data files compatible with the CORE module routines. Table 9 summarizes the program segments, associated routines and their function for the CORE module.

Table 9. -- CORE Program Segments

NAME	SUBROUTINES	USE
XSEC	-	Cross-sectional corehole analysis
RTRVL	-	Retrieves corehole records from keyed file
COREL		Corehole parameter based correlation
GRFF	SORT, XLINE, INTER	Draws bar graphs
BUILD BF2 INPT		Conversion and test programs used to convert raw corehole data to data files compatible with the rest of the CORE module.

Program CORE

Program Core is scheduled by DENRV to interface between the user and the CORE hole analysis routines. Upon execution, CORE first places a menu on the Tektronix screen. Based on the user's selection from the menu, either program XSEC or COREL will be scheduled, or control will be returned to DENRV. XSEC is the program which interactively performs cross-section corehole data analysis, while COREL performs corehole based parameter correlation. The user is referred for further information to the description of these two routines, and to Appendix B for a summary of the characteristics of CORE.

Program XSEC

Program XSEC is executed when the user selects option 1 of the corehole analysis option of Data Entry and Review. It allows the user to build an ASCII XYZ file of a cross-section of several coreholes. The ASCII file may then be converted to a grid file through the use of related data entry and review programs. This allows the user to see three dimensional or contour displays of the varying concentration values of a particular parameter down through the test hole and between different test holes. This process is illustrated in Figure 6.

The user inputs the names of the binary keyed files he wants to analyze and the parameter (choose from #RAW29, #RAW31, #RAW32, #RAW35, #RAW37). The X, Y coordinates of each hole are retrieved and plotted on a "map" of the test hole area. The user is also given the option of choosing the X, Y coordinates of each test hole by marking the location on the "map".

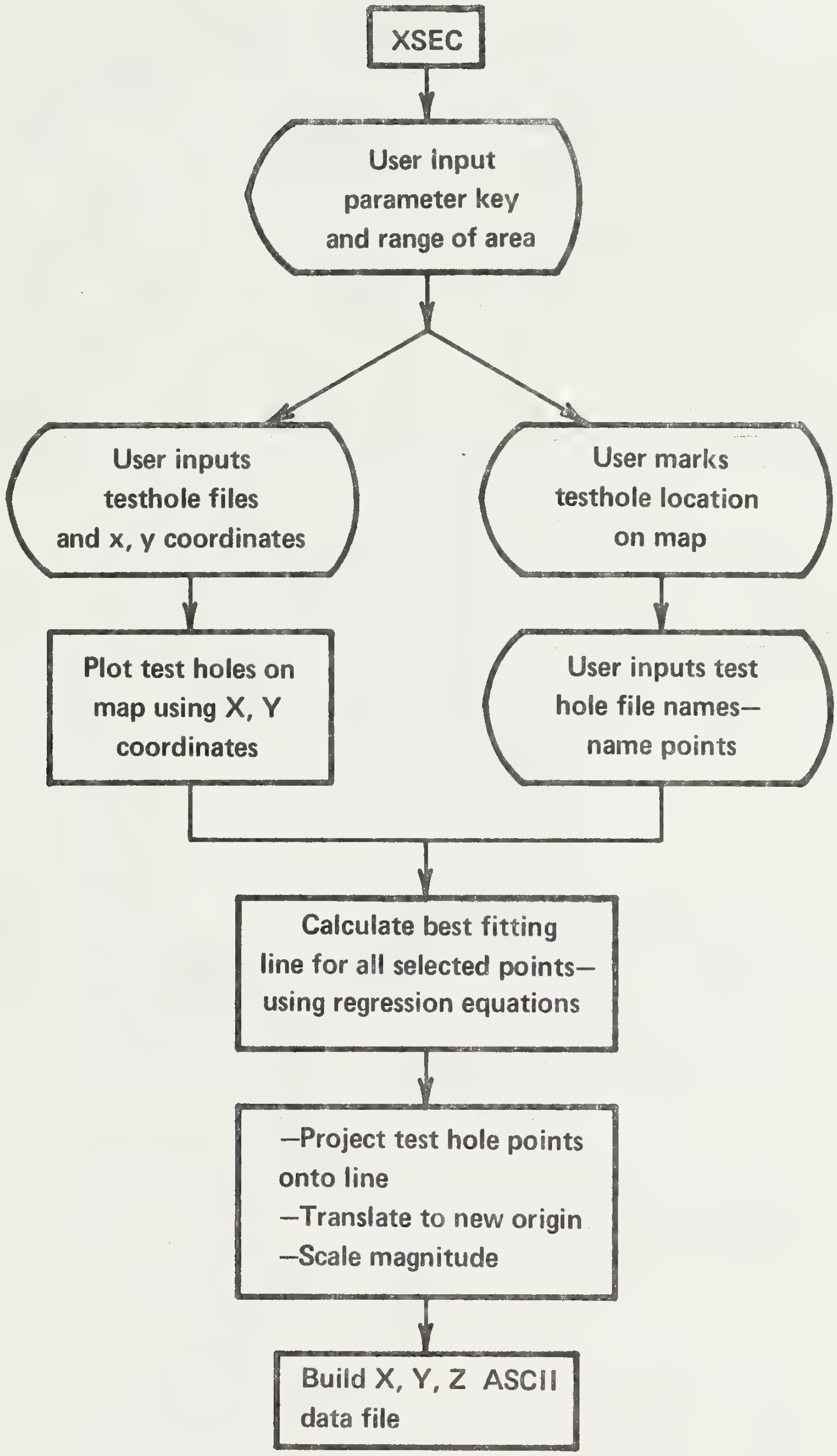


Figure 6.—Cross-section corehole analysis procedure

The X, Y coordinates of the selected holes are projected onto a straight line whose equation is calculated by the use of regression equations. The new test hole coordinates are translated to a new origin (XO), YO), the left most coordinate of the line within the mapping area, and scaled so the magnitude of the coordinates ranges between 100 and 1,000. The scaled X coordinates on the new X-axis are written as the x parameter into an ASCII XYZ file. The elevations at each sampling interval are written as the Y parameter into the XYZ files. The parameter key concentration value at each interval is written as the Z value in the file. Finally, control returns to the corehole analysis options.

Program RTRVL

Program RTRVL is used by program XSEC to retrieve data from the keyed access files used by the corehole analysis programs. It uses the keyed access routines OPENK, RETRV, and CLOSK.

First, the specified corehole file is opened by OPENK. Then the first header of the file is retrieved by RETRV. This header contains the number of records in the file as well as other information. RTRV1 then reads the second (user) header of the file, again using RTRV, which contains the elevation levels where samples were taken for the corehole of interest. Next, the data record for the corehole is retrieved, and finally the raw data file for the corehole is closed, (using CLOSK). At this point control returns to the program XSEC.

Program COREL

Program COREL is executed when the user selects option 2 of the corehole analysis menu. It is designed to let the user correlate test hole beds based on non-lithologic parameter (data)types. Program COREL uses the binary keyed files created by RNPT. (#RAW20, #RAW29, #RAW31, #RAW32, #RAW35, and #RAW37 are samples available for demonstration.) The user specifies one parameter, or key, to be evaluated and analyzes one hole at a time. The general procedure is summarized in Figure 7.

COREL then swaps in GRFF which creates a bargraph display. The concentration values of the parameter are shown in the X direction and the sampling interval elevation in the Y direction on this display. The user must next verify the accuracy of the given critical value, or specify one if there isn't a default value given.

Next, the elevations where the parameter concentration values are greater than or equal to the critical level are marked on the graph. The user selects elevations which mark the upper and lower boundaries of a "bed", and labels the bed with a 4 character name, for example BEDA, which is used as the first half of the name of the ASCII XYZ file which contains the X, Y coordinates hole and the elevation of the boundary as the Z value. Up to 15 unique beds per test hole are allowed.

This process of marking and labeling beds is repeated for up to 100 test holes allowing the user to compare two beds at a time in order to corelate the beds. Each time a new test hole is selected control returns to COREL, the data is retrieved via the utility programs and passed to GRFF through COMMON when GRFF is swapped in again.

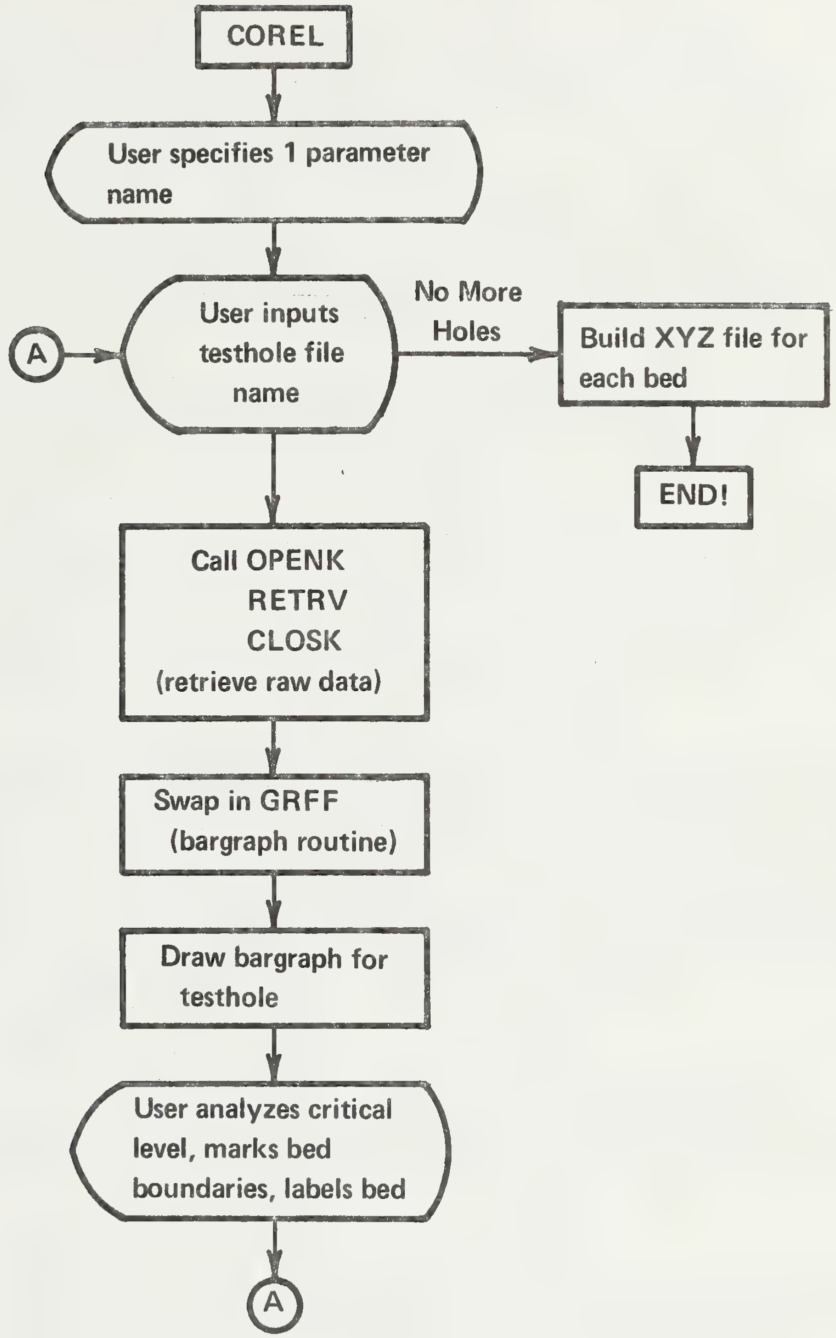


Figure 7.—COREL Correlation Procedure

When all the holes have been evaluated, COREL creates 2 ASCII files for each bed named. One contains the X, Y (location) Z values (elevations) of the top of the bed (ex #TBEDA) one per hole, and the second file contains the Z values of bottom of the bed (ex #BBEDA).

Binary XYZ files, grid files, contours and 3-dimensional displays may be constructed from these ASCII files by other Data Entry/Review programs. Upon completion of COREL control returns to the corehole analysis options.

Program GRFF

Program GRFF is scheduled (swapped) by COREL and is designed to display a bargraph of the concentration values of a given parameter of a test corehole.

The screen is first cleared, then labelled X and Y axes are drawn on the screen. The bargraph of the parameter of a test corehole is then drawn and labelled. The X-axis gives the concentration of the parameter and the Y-axis gives the sampling interval elevations. The label includes the name of the corehole along with the name of the parameter displayed. A dashed critical value line is also shown and labelled on the map.

The critical value can then either be confirmed or altered. There are two different ways for the user to alter the critical value. The first is by typing in the new critical value, and the second is by positioning the cursors on the bargraph to the new critical value. The user then specifies and lables beds from this corehole. This is accomplished by using the cursors to locate the top and the bottom of each bed of interest. Finally this data is written out to an ASCII XYZ data file for future use, and returns to the program COREL.

Subroutine XLINE

Subroutine XLINE draws the critical level line on the bargraph for the program GRFF. It also labels this critical value line and shows the default value for the line if one exists.

Subroutine INTER

Subroutine INTER performs the user interaction for the program GRFF. It also retrieves the name of the next test corehole to be correlated. It allows the user to define a new critical value for the test corehole, which is done either by entering the new critical value directly using the keyboard on the scope, or by positioning the cursors on the bar graph to the new critical value.

Subroutine SORT

Subroutine SORT finds the maximum and minimum of the concentration for a parameter of a test corehole.

Program BUILD

Program BUILD is a typical application program for the corehole analysis option of data entry and review. It implements the first step in a two step process to convert the Thunder Basin corehole data into keyed access binary files which can be used by the corehole analysis routines.

Program BUILD takes the original data, which is in a type three file ASCII, (variable length records, sequential access), and writes it into a Hewlett-Packard type two file binary (fixed length user-defined records, random access).

Program BF2

Program BF2 is a test and verification program used on the keyed access binary files (created by INPT) that are used for the corehole analysis option of data entry and review. It uses the keyed access routines OPENK, CLOSK, RETRV. These routines are used to open, close, and retrieve data, respectively on the corehole files.

Program INPT

Program INPT is an example application program for preparation of raw data files for corehole analysis. It is the second step in a two step process to convert Thunder Basin corehole data into keyed-access binary files which can be used by the corehole analysis routines.

Program INPT takes the type 2 file (fixed length, user-defined records; random access) created by BUILD and creates a keyed access binary file from it, using the keyed access routines. The keys for this file are the names of the parameter used in sampling the corehole.

The sizes of the data files are specified in this program. BUILD and INPT may be used as models for converting corehole data from its original format to the format required by the access routines which are used in COREL and XSEC. The data needed by the utility programs is passed from the main program through COMMON, and as arguments in the subroutine CALL.

The keyed file I/O programs that are used by INPT are:

SETUP (NAM) - Creates a binary file (NAM) according to the block and record length sizes specified in COMMON and saves these sizes in the first five words of the file.

INSRT (KODE, IHEAD, IKEY, IWD, IBUFH) - inserts IBUFH as a header record, length = IWD, or as a parameter key record. Each parameter key is written in a key header where the position of the key in the header corresponds to the position of the data record in the file.

CLOSK - Closes the keyed file.

BLOCK DATA - required because labelled COMMON is used in all utility routines.

GRCNT MODULE

The programs and subroutines comprising the GRCNT module of SEAMPLAN provide the user with the ability to translate raw ASCII XYZ data to data files compatible with the grid file operation and display modules. These grid files are used to generate contour maps, and three dimensional maps which are useful in providing the user with an understanding of the lay of land he is working with.

This conversion from raw ASCII XYZ data to binary grid files is a two step process. The first step is to convert the random ASCII XYZ data to sorted binary data files. These sorted binary data files are then used as input for the generation of the grid files.

Many of the programs and subroutines used by this module were adapted from the Stampede package. Table 10 summarizes the program segments, associated routines and their function for the GRDNT module.

Table 10. -- GRCNT Program Segments

NAME	SUBROUTINES	USE
GRCNT	-	Control
NMPRX	-	Constructs a square grid system over an area described by XYZ input.
STMBS	-	
STMBT	STMBB, STMBC, STMBD, STMBZ	
STMBU	STMBG, STMBH, STMBI, STMBJ, STMBK, STMBZ	
STMBV	STMBE, STMBF, STMBZ	
MAKFL	-	Control for conversion from ASCII XYZ to binary files.
MKINP	-	Input of ASCII XYZ file
MKSRT	STMAD	Sorts ASCII XYZ file
MKOUT		Output of sorted ASCII XYZ file to binary files

Program GRCNT

GRCNT is scheduled (swapped) by DENRV, and allows the user to translate available alphnumeric XYZ data files into internally compatible sorted binary XYZ files. Also, this routine allows the translation of these binary files into grid files which may then be used in a variety of displays. The logic of the routine is fairly simple, and begins with presentation of a menu on the screen to the user. Following input of the users options code selection, program MAKFL or NMPRX may be scheduled to accomplish the binary XYZ file construction of grid file. Alternatively, control may be returned to DENRV. Following selection of either of the file construction options, the menu is once again displayed until the user elects to terminate. For information concerning the formats and use of each of the file types controlled by GRCNT, the user is referred to Appendix B. In addition, GRCNT's characteristics are summarized in Appendix B.

Program NMPRX

A complete description of the function of STAMPEDE program NUMAPROX can be found in the Stampede Reference Manual (1). For purposes of implementation of the minicomputer system, user interactive input was added to the program and the program was divided into swappable segments (STMBS, STMBT, STMBU, STMBV) and a control executive (NMPRX). The maximum grid size was reduced from 400X400 to 50X50 due to memory limitations. Subroutine STMBZ, originally written in IBM 360 assembly language whose function is to maintain a status bit array representing the degree of grid completion, was rewritten in Hewlett-Packard assembly language. The basic logic of NMPRX is shown in Figure 8.

Inputs required of the user are the source binary X, Y, Z data file name and the destination grid file name (see Appendix D). The user must also specify the limits, or boundaries of the grid to be created in the form of minimum X, minimum Y, maximum X, and maximum Y. If all of these values are set to zero, the program will use the values as it finds them in the input file. The user also specifies the desired grid cell size and the maximum scanning radius (in number of all sizes) to be used in forming the grid. He may optionally request that all inputs points be verified to insure the validity of the final grid. The routine then creates the grid, making use of a temporary direct access file called $IWKFL, and stores the final grid on disc.

Program MAKFL

A complete description of the function of MAKFL can be found in the Stampede Reference Manual (1). The Stampede version was modified somewhat to facilitate implementation on the minicomputer system. The basic logic of MAKFL is shown in Figure 9. The program consists of an executive, or father program, MAKFL, which swaps in three sons: MKINP, MKSRT, MKOUT. MKINP determines the ASCII XYZ file name and reads the data; MKSRT sorts the data on ascending X with dexcending Y; MKOUT determines the binary X, Y, Z data file name and writes the data to that file. Data file formats are described in Appendix D.

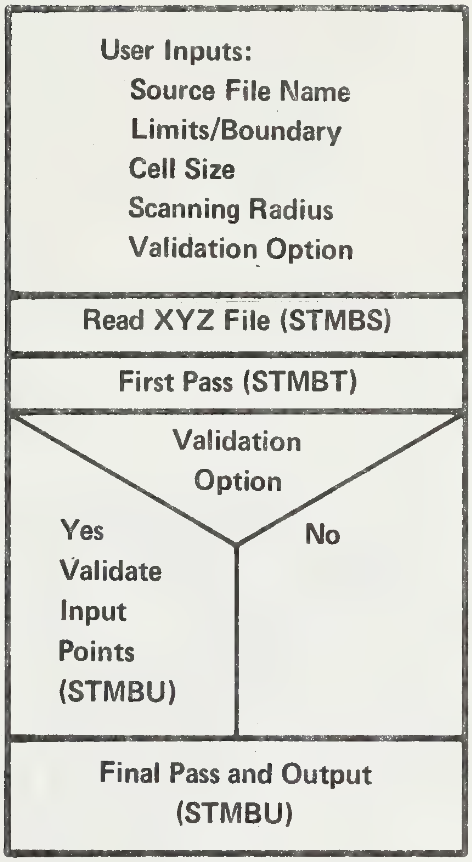


Figure 8.—NMPRX Logic

Get File Name
Input ASC II X, Y, Z File (MKINP)
Sort Data Records (MKSRT)
Store Binary Sorted Data on Disc (MKOUT)

Figure 9.—MAKFL Logic

Program GRDNT

A complete description of the function of Stampede program GRIDINT can be found in the STAMPEDE Reference Manual (1). The program was modified for compatability with the minicomputer system and for interactive user inputs. Figure 10 shows GRDNT logic. Inputs required of the user are the grid data file name (see Appendix D), the new grid file name, and X and Y limits or bounds on the new grid, and the grid interval. The program then interpolates values from the output grid using mesh values from the original grid. The new grid is then stored on disc.

OPRAT MODULE

The programs and subroutines comprising the OPRAT module of SEAMPLAN provides the user with a set of basic mathematical operations that can be performed on grid files. These operations consist of addition, subtraction, multiplication and division.

These mathematical operations are performed on the corresponding elevations of two or three grid files or may be used to alter each elevation of a single grid file by a specified constant.

Table 11 summarizes the program segments, associated routines and their respective functions for the OPRAT module.

Table 11. -- OPRAT Program Segments

NAME	SUBROUTINES	USE
OPRAT	STMMA, STMMB, STMMC, STMMD, STMME, STMMF, STMNA, STMGB, STMYZ, STMXZ, UPDAT	Grid fill operations program.

Program OPRAT

A complete description of the function of the Stampede program OPERATE can be found in the Stampede Reference Manual (1). The program performs addition, subtraction, multiplication, or division between two or three grids or two or three Z values in a binary X, Y, Z file. The program can also perform operations on Z values with user-specified constants. These operations allow for the creation of isopach, stripping ratio, and similar manipulated data. Data files are described in detail in Appendix D, and the logic for program OPRAT is shown in Figure 11.

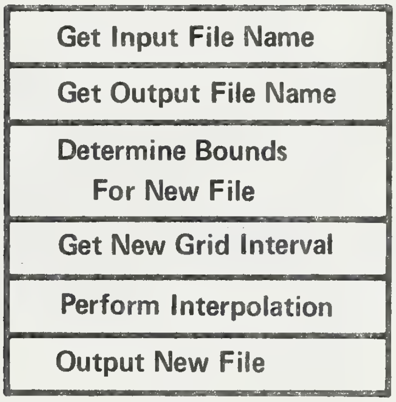


Figure 10.—GRDNT Logic

Get File Name(s)
Read Data
Perform Operation(s)
Write Data

Figure 11.—OPRAT Logic

CSEDT MODULE

The programs and subroutines comprising the CSEDT module of SEAMPLAN provides the user with a fairly complete set of editing functions to be performed on grid files.

Through the use of this module the user is able to step through a grid file, either by rows or columns, and verify or change the contents of the specified grid files. All of the displays and edits are shown on the Tektronix 4014 as a cross-sectional view.

Table 12 summarizes the program segments, associated routines and their function for the CSEDT module.

Table 12. -- CSEDT Program Segments

NAME	SUBROUTINES	USE
CSEDT	CODER	Grids edit controls
CSEIN		Grid file input
CSEDO	CSDRW, CODER	Editing and displaying of grid files
CSEOT	CODER, UPDAT	Final processing for the CSEOT MODULE

Program CSEDT

This program performs initialization and executive functions for two-dimensional display and editing of uniform grid data. Lack of space made it necessary to transform real data values to integer values within the program since integer values only use one 16-bit word, while real values use two 16-bit words.

Initialization of windowing variables and the integer matrix takes place. The user is requested to specify source file names. Subroutine SPOLU opens these files. The user also has the option of changing the header name (JOBNAM).

The vertical elements of the windowing are determined by the minimum and maximum Z values in the source files. This windowing is adjusted to allow during editing, addition of up to 10% to the minimum and maximum Z and maximum X values or minimum and maximum Y values depending upon whether rows or columns are to be displayed.

The real data values are transformed by subtracting the minimum Z value from each data point, and then seating the resulting values, and placing them in an integer matrix (MATZ). The COMMON block is written to a disc track and the source files are closed. CSEDT then schedules programs CSEDD and CSEDT. The COMMON block is defined in Appendix C, and the logic is summarized in Figure 12.

Program CSEDO

CSEDO is the primary functional program in the CSEDT module. Figure 13 summarizes the basic logic. The COMMON block must be read from disc storage. The row(s) or column(s) to be displayed are transformed from integer format back to their original real values in subroutine CODER.

Program CSDRW displays and edits the cross-section, which uses cross-hair cursors to edit. The following is a list of edit options and their effects.

D - The numeric value of a point on a displayed surface is displayed, indicated by the position of the cursors.

C - A point on a displayed surface is changed to a value indicated by the position of the cursors. The new point is marked by a cross (+) on the screen, and its numeric value is also displayed.

P - A plotter copy of the section is produced.

J - The data values for the currently displayed cross-section are transformed back to integer values. The user specifies a new row or column, and the new cross-section is transformed to real values and displayed.

T - Control is transferred back to CSEDT, and segment 3, CSEOT, is swapped in. Destination files will be created in CSEDT.

A - Control is transferred back to CSEDT, and segment 3, CSEOT, is swapped in. No new files will be created.

When editing has been completed the COMMON block must be written to the storage disc, and segment 3, CSEOT, will be swapped in. The COMMON block is the same as that described for CSEDT (see Appendix C).

Program CSDRW

Program CSDRW is swapped in by CSEDO to draw cross-sections on the CRT or plotter. Its logic is shown in Figure 14. Since it may be accessed many times during a cross-section display and edit session, COMMON is not written to a disc track, rather it is passed through system available memory. For this same reason, the program terminates using the Hewlett-Packard RTE III serial reusable termination: CALL EXEC (6,0,-1) (2).

Initialize
Open Grid Data File(s)
Modify Data File Headers
Set Windows
Read and Transform Data
Swap Drawing and Output Modules

Figure 12.—CSEDT Logic

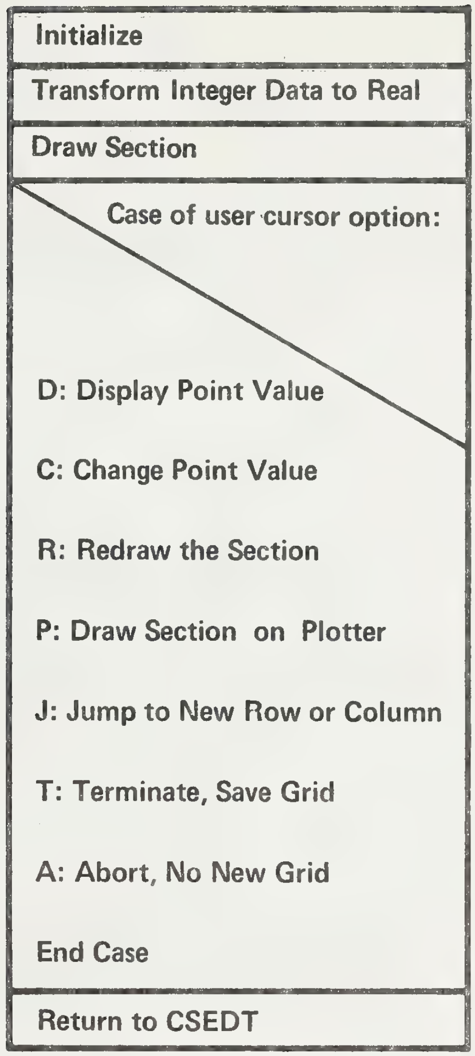


Figure 13.—CSEDO Logic.

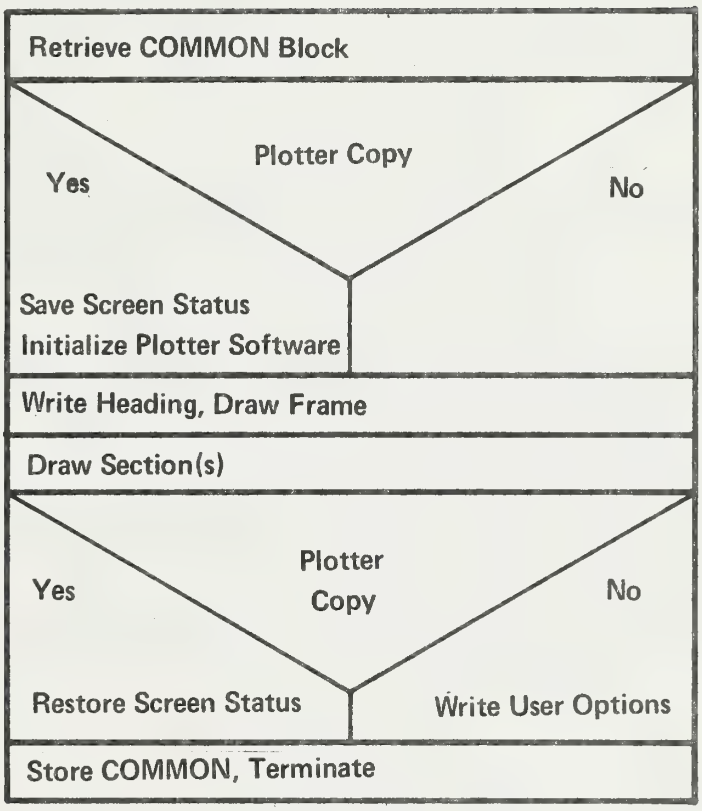


Figure 14.—CSDRW Logic

This prevents the program from being swapped from the disc on subsequent executions. These two methods result in a great savings in run time, due to reduced disc I/O requirements.

After retrieving COMMON, the program checks for screen or plotter display by examining the COMMON variable SIZE. (If SIZE = 0, a screen is desired.) If a plotter copy is desired, the terminal status is saved prior to the plot and restored after it is complete.

The horizontal and vertical axes are drawn and scaled first, and then the cross-section is drawn. If any data point is surrounded by null points, the data point is marked by an X. User instructions are displayed below the cross-sectional display if the display is on the screen.

COMMON is written back to system available memory prior to termination.

Program CSEOT

CSEOT handles final processing for the CSEDT module. Its logic is shown in Figure 15. The COMMON block is read from disc storage. If the user specified edit command A (abort end), no processing is done in CSEOT, and control is returned to the main program, CSEDT.

If the user specified edit command T (termination), the destination files will be used. The last cross-section to be displayed must be transformed back to integer form. Destination files to hold the edited data are created and opened. For each destination file a header record must be written, each row is transformed back to real values, the start, end, and data values for each row are written as a record, and a terminal record is written. The destination files are then closed. If the minimum and/or maximum Z values have changed for any file during the editing process, the header record of the destination file must be changed. This is done by the subroutine UPDAT. Control is then transferred back to CSEDT. The disc tracks used for the COMMON block are de-allocated, and the program ends.

Subroutine CODER

Subroutine CODER is accessed by CSEDT, CSEDO, and CSEOT to transform real values to integer values, and vice versa. When it is being used the first time in CSEDT, and the last time in CSEOT, it also scales the values based on minimum and maximum Z values.

The subroutine arguments are as follows:

KODE: Indicates mode of conversion
1. real to integer
2. integer to real.

IDIR: Indicates direction
1. transform rows
2. transform columns
3. transforms entire grid.

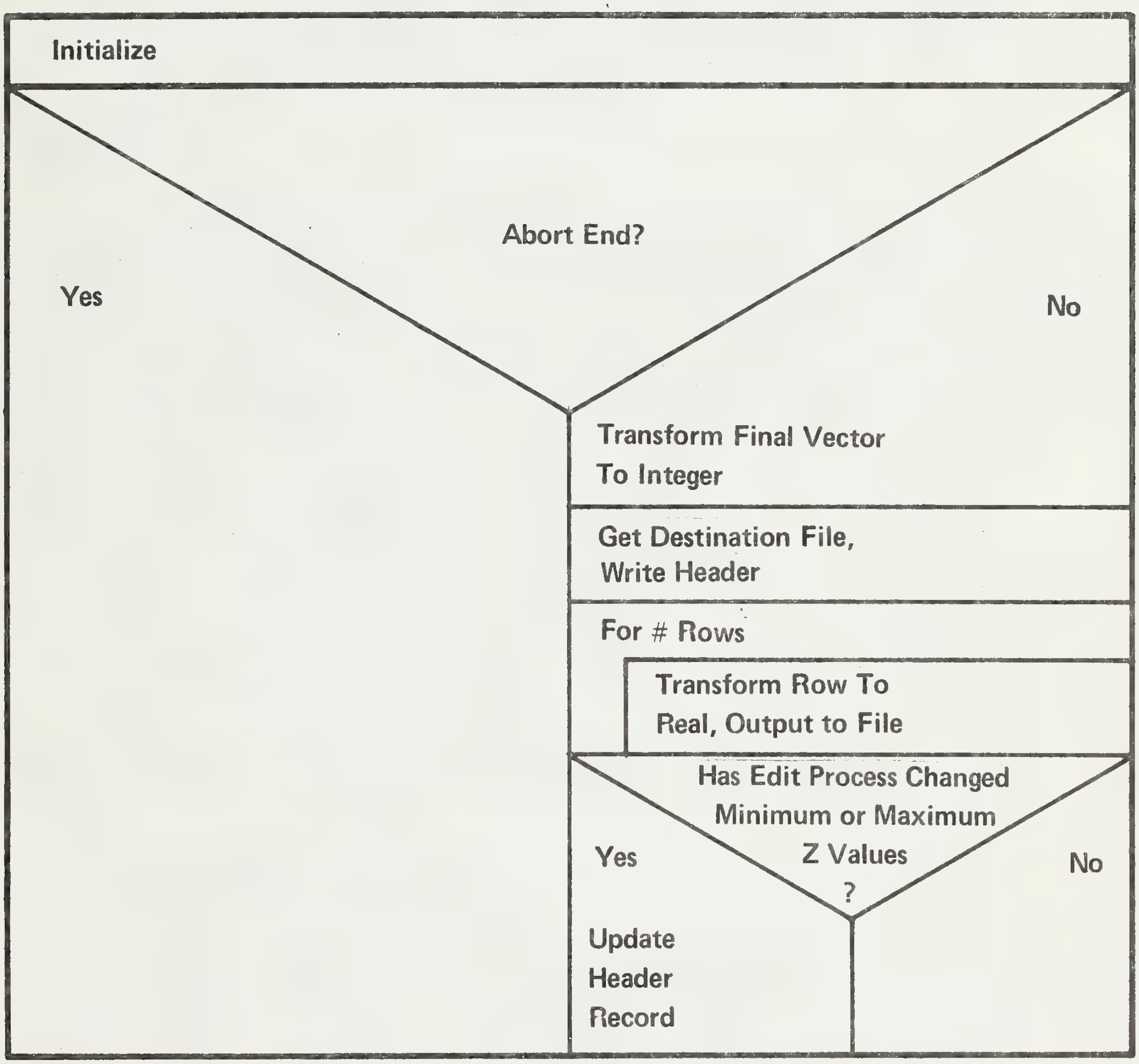


Figure 15.—CSEOT Logic

Branching occurs upon entry to the subroutine and the appropriate transformations take place.

Subroutine UPDAT

Subroutine UPDAT reads the header record of a grid data file (see Appendix C) and modifies the ZMIN and ZMAX values in such a way that an end of file is not written after the record is rewritten.

The subroutine arguments include a three-word integer array containing the file name, followed by the new (real) values for ZMIN and ZMAX.

The specified file is forced open as a Hewlett-Packard type 1 file in update mode. The sector containing the header record is read, the Z values are modified, and the sector is rewritten. The file is closed and control returns to the calling program.

CS3DD MODULE

The programs and subroutines comprising the CS3DD module provide the SEAMPLAN user with the ability to examine small sections of a grid file with three dimensional displays. These displays effectively allow the user to get a good feel for the lay of a small portion of the land to help him design his mine and/or reclaim the land after mining.

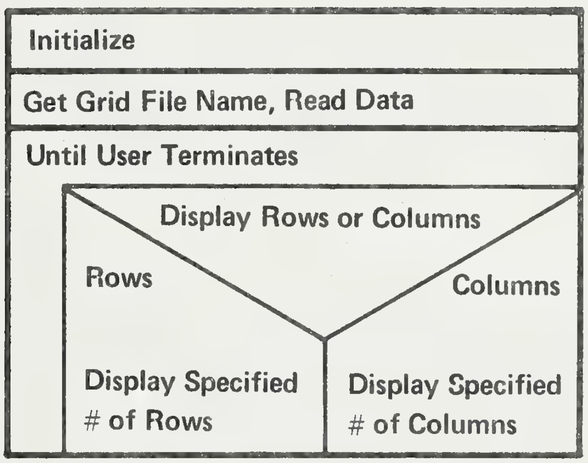
Table 13 summarizes the program segments, associated routines and their function for the CS3DD module.

Table 13. -- CS3DD Program Segments

NAME	SUBROUTINE	USE
CS3DD	RDGRD, PLT3D, FRAM1	3-d displays

Program CS3DD

CS3DD simultaneously displays a user-specified number (1-5) or rows or columns of a single grid file in three-dimensional cross-section format. The basic logic for CS3DD is given by Figure 16. Following initialization of various local variables, the user must specify the grid data file name. After reading the grid data, the maximum possible display size is computed based on the grid size so that the appropriate scale factors are used to insure the display fits on the screen. The user then must specify the direction of desired display (rows or columns), the starting section index, and the number of sections to be drawn.



Figures 16.—CS3DD Logic

The cross-sections will be rotated -25^{o} about the Y axis, while columns will be rotated -65^{o} about the X axis with rows displayed toward the left side of the screen, and columns toward the right side of the screen. To correctly place the cross-sections on the screen, two factors, ADDX and ADDY, are added to each data point before it is displayed. The values for these factors are determined by transforming the corner points of the display as will be done in the 3-dimensional display routine, and then calculate ADDX and ADDY, which will place the transformed points where desired on the screen. After these factors have been calculated a buffer is filled with the row or column to be drawn. The cross-section is then drawn by the subroutine PLT3D and framed by the subroutine FRAM1. Documentation for subroutine PLT3D can be found with program TRD. The user is then given the option to draw more cross-sections or terminate. Upon termination, control is returned to DRVED, the scheduling program.

Subroutine RDGRD

Subroutine RDGRD reads grid data files and stores the data in COMMON. Figure 17 summarizes RDGRD's logic. The file name is contained in COMMON. If an open or header access results in an error, the single argument IER is set negative and the routine returns to the calling program. If a grid file is successfully opened, the contents are read and stored in COMMON prior to a return.

Subroutine FRAM1

Subroutine FRAM1 draws a frame below each 3-dimensional cross-section display produced by CS3DD. The subroutine has two arguments, VERTEX and ADDY. VERTEX is a 16-word real array which contains the coordinates of vertices of 3-dimensional displays. VERTEX is maintained by subroutine PLT3D and is updated as each sectional line is drawn. ADDY is the real off-set value calculated in CS3DD which positions the display on the screen. Subroutine FRAM1 modifies some VERTEX using ADDY, then produces the frame underneath the section. No COMMON blocks are used.

TOPO MODULE

The programs and subroutines comprising the TOPO module provide the user of SEAMPLAN with a contour display of an area of interest.

The contour displays are generated from the grid files and are displayed on the Tektronix 4014. The contour maps are useful in determining a mine area and a mine plan. These displays are also useful in the reclamation phase of SEAMPLAN, as they show the user the actual contour of the land before the mining process began.

Table 14 summarizes the program segments, associated routines and their function in the TOPO module.

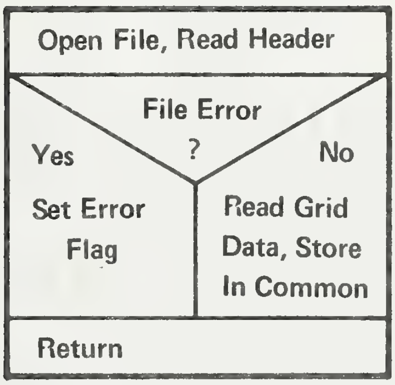


Figure 17.—RDGRD Logic

Table 14. -- TOPO Program Segments

NAME	SUBROUTINES	USE
TOPO	LINEF, BOX, ZOOM	Produces the actual contour displays
CNTRG	BOX, PLTCN	Set up routine
GRDIN		Reads the grid file

Program TOPO

Program TOPO is scheduled by the Data Entry and Review executive, DENRV, and the pit layout routine, PTOPO, for the purpose of producing contour displays of a gridded data. Its logic is given in Figure 18 . The program first initializes variables for a screen display and optionally (depending on the value of ICODE) allocates a disc track for program swapping. The user must then optionally specify a grid data file name which is read by program GRDIN, which is swapped at this point. The contour interval for the display is then requested from the user. The screen and virtual windows are set, first based on the indices of the entire grid, but later based on the reduced area indices as set by subroutine ZOOM. The header is then produced and the contours are drawn by virtue of a swap of program CNTRG. Upon completion of the display, the user may request a plotter reproduction. If he does, the screen status is saved and the plotter software is initialized. A branch to reset the windows takes place, and the plotter copy is generated. The user may request a new contour interval and if he does, the new display is produced on the screen. He may also choose to zoom in on a portion of the current display.

Subroutine ZOOM utilizes the crosshair cursors to establish new bounds for the display, which will be enlarged to fill the screen and drawn after a new (or the same) contour interval is requested. The following variable is appended to the standard grid file COMMON block (see Appendices C, D):

CINT - the Contour interval for the display.

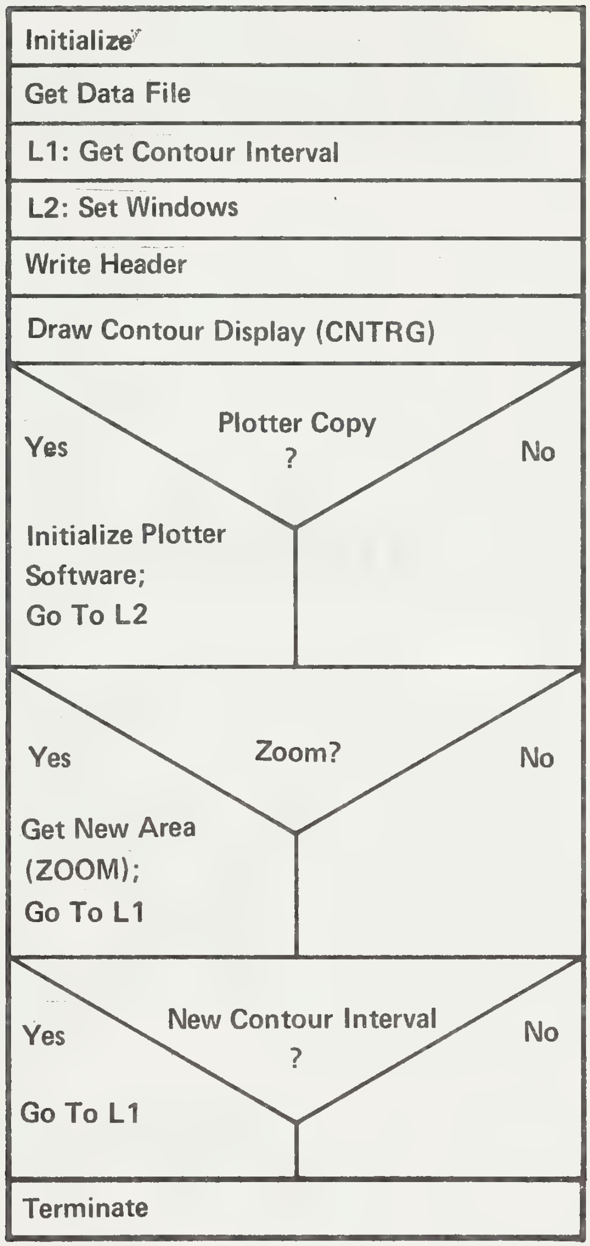


Figure 18.—TOPO Logic

Subroutine BOX

Subroutine BOX draws a rectangle around the area whose vertices are the arguments of the subroutine using the current virtual window definition. It is called with four real arguments, defined as follows:

XMIN - X coordinate of lower left vertex
YMIN - Y coordinate of lower left vertex
XMAX - X coordinate of upper right vertex
YMAX - Y coordinate of upper right vertex.

Subroutine ZOOM

Subroutine ZOOM, called by programs TOPO and PTOPO, uses the cross-hair cursors on a contour display to describe a subarea to be redrawn and enlarged. The basic logic is shown in Figure 19. The subroutine requests the minimum (lower left) corner and uses the cursor to input the location. This location is then adjusted to the index of the nearest grid point which will be inside the cursor input location. This procedure is repeated for the maximum (upper right) corner. The two corner points thus computed are then checked to insure that they are within the range of the current display. A call to subroutine OUTLN is used to outline the new area prior to the return to the calling program. The COMMON block used by ZOOM is the same as that of the calling program, (see Appendix C) whether that be TOPO or PTOPO.

Program CNTRG

CNTRG performs all the setup functions which are required by the grid contouring subroutine. Its logic is given in Figure 20. COMMON from the disc, the display logical unit is recovered to allow plots to be produced on either the CRT or the plotter. The current minimum and maximum grid subscripts from the COMMON block are used to frame and label the display using the current virtual window definition. After determining whether or not the contour interval is integral, an appropriate integer or real format is constructed as required by the contouring subroutine, which is then called.

This routine moves through the grid cells examining four adjacent grid points at a time to perform the necessary interpolation to draw the isoline for that grid cell. Each elevation is labeled only once for each twelve units of grid cell in the X direction. Information on which lines have been labeled is maintained in the local integer vector LEVEL. The program terminates after the contours are drawn and labeled.

The program uses the standard grid COMMON block (see Appendix C) with the addition of a single real variable:

CINT - The current contour interval selected by the user in the calling program.

Write Directions, Cursor Input Lower Left
Write Directions, Cursor Input Upper Right
If New Corners Outside Range, Reset to Old Corners
Outline Area; Return

Figure 19.—ZOOM Logic

Retrieve COMMON From Disc
Get LU For Plotter or Terminal
Draw and Label Frame
Construct Formats for Contours
Call Contouring Routine
Terminate

Figure 20.—CNTRG Logic

Subroutine PLTCN

Subroutine PLTCN is called by program CNTRG with the following arguments:

NC - number of grid rows
ND - number of grid columns
GRID - 2-dimensional matrix (NC X ND) containing Z values
ZMIN - minimum Z value in the grid
ZMAX - maximum Z value in the grid
CINT - contour interval
MINX - minimum column subscript
MAXX - maximum column subscript
MINY - minimum row subscript
MAXY - maximum row subscript
IFMT - array containing format for contour labels (dimensioned in calling program)
LSZ - number of characters produced by the format in IFMT.

PLTCN's logic is summarized in Figure 21. While NC and ND are the dimensions of GRID as declared in the calling program, MINX, MAXX, MINY and MAXY define a subset of the grid to be displayed. A twenty-five element local array is maintained to insure that a contour line is only labeled once. This array is initilized upon entry to the routine and is updated each time a label is printed. The number of label characters (LSZ) is multiplied by the negative character width and is subsequently used to insure that all labels fall within the boundaries of the display frame.

A scan of the entire grid is performed prior to producing the display and those grid cells containing missing data are outlined. The grid is then scanned within the limits of the calling arguments, and the four corner points of each cell are examined and used as the basis of interpolation to determine if the first contour line is to be drawn in the cell. The contour interval is then increment and the process repeats itself throughout the entire grid.

The routine receives all information required from the arguments and as such, the only COMMON required by the routine is Tektronix COMMON (see Appendix C).

TRD MODULE

The programs and subroutines comprising the TRD module of SEAMPLAN provide the user with three-dimensional displays of grid files. These routines were adapted to the M.S.U. installation from the three-dimensional package in the Journals of the ACM.

The TRD module provides the user with the ability to view three-dimensional displays of grid files from different positions on the Tektronix 4014. These displays provide the user with an excellent feel for the lay of the land since he is able to view the area he is working with from different angles of rotation and horizontal angles.

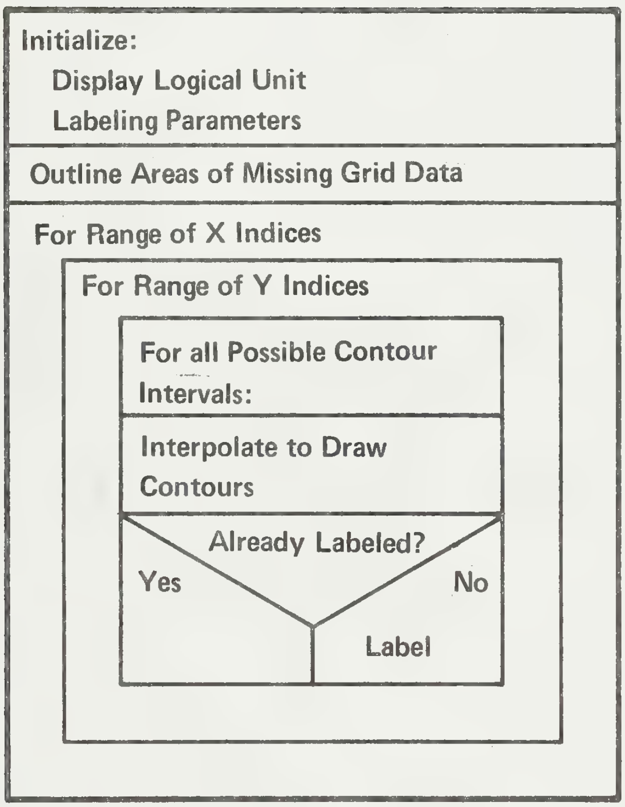


Figure 21.—PLTCN Logic

Table 15 summarizes the program segments, associated routines and their respective functions in the TRD module.

Table 15. -- TRD Program Segments

NAME	SUBROUTINES	USE
TRD	FILBF, PLT3D, FRAMR	Actual 3-D grid displays
GRDIN	-	Grid file input
STUP3	-	Initialization

Program TRD

Program TRD is swapped by the Data Entry and Review executive (DENRV). Its logic is shown in Figure 22. No COMMON is read, but initialization takes place as follows: the terminal control system is initialized, ID segments for the son programs are replaced and setup is performed for swapping. The name of the grid file to be displayed is determined, and the grid data is read by program GRDIN. The X and Y scales for the displays (XS and YS) are then calculated based on the distance between grid corner points. These values are used to insure that all subsequent three dimensional displays are positioned correctly on the screen. It should be noted that the three dimensional coordinate system used by TRD and its subroutines and son programs is not the typical right-handed coordinate system generally referred to in the report.

The X axis is the horizontal screen axis, the Y axis is the vertical screen axis, and the X axis is the axis pointing to the user perpendicular to the screen. This is the convention of subroutine PLT3D and was adopted throughout the module. The code in the remainder of the program may be executed more than once, depending on the number and type of displays the user wishes to view. The viewing position parameters are then requested from the user for each display. Due to memory limitations, these parameters are retrieved by program STUP3, which is swapped at this point in the program. The display is then produced. The header containing the grid file information and viewing position parameters is written. The values of arguments for subroutine PLT3D are assigned. Then for each line drawn in each direction subroutine FILBUF is called to fill the buffer (OUTBUF) with grid data points and subroutine PLT3D is called to plot the line. When all rows and columns are drawn, subroutine FRAMR draws a frame or box around the display using the vertices as corner points. The user may then request a plotter copy, redraw with hidden lines removed, change viewing position parameters, or terminate. Prior to termination ID segments and disc tracks used for swapping are released.

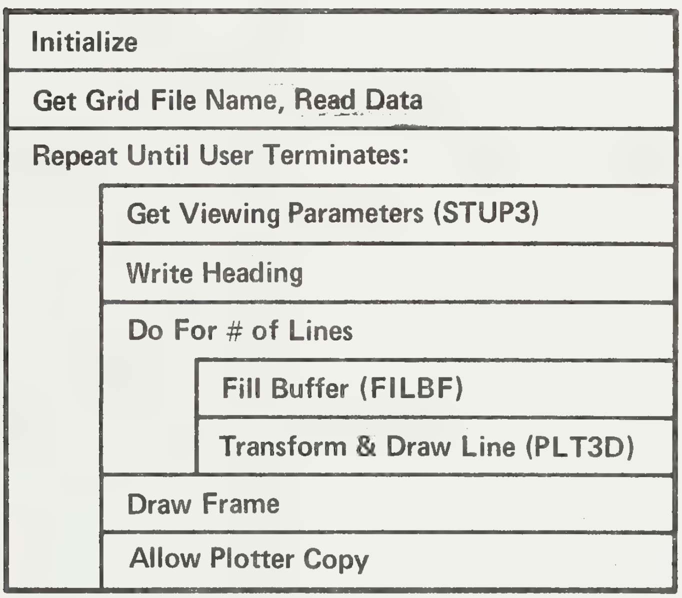


Figure 22.—TRD Logic

The COMMON block used by program TRD is the standard grid file COMMON block (see Appendix C) with the following variables appended:

PHI - rotation component about vertical axis.

THETA - rotation component about horizonatal axis.

ADDX - component to be added to each X value prior to display to insure horizontal screen position of display.

ADDY - component to be added to each Y value prior to display to insure vertical screen position of display.

FACTOR - value each point is multiplied by prior to display to emphasize relief (FACTOR>1) or to minimize relief (FACTOR<1).

IHIDE - hidden line flag:

0: draw all lines

1: remove hidden lines

INDEX - number of point values placed in the buffer for the display of each line.

IQUAD - the viewing position quadrant based on PHI:

1: 0 < PHI < 90

2: 90 < PHI < 180

3: 180 < PHI < 270

4: 270 < PHI < 360

NPNTS - the number of points in the current row or column of the grid.

OUTHTA - the user input value of THETA

OUTPHI - the user input value of PHI

XS - the permanent value of the X scale

YS - the permanent value of the Y scale

XSCALE - set to ±XS, depending on viewing position

YSCALE - set to ±YS, depending on viewing position

ZSCALE - the Z scale value, set according to plot direction.

Upon entry to the routine, branching occurs based on argument ITIME and COMMON variable IQUAD, the viewing position quadrant. Then the buffer OUTBUF is filled with a grid row or column in either ascending or descending order. The order may change since all user-input-viewing-position-angles are resolved to be less than 90^{o}; thus, the order in which the buffer is filled allows the display of a grid from the "back side." In addition to the three arguments, the entire TRD COMMON block is included (see Appendix C, TRD description).

Subroutine FILBF

Subroutine FILBF is called by program TRD with the following arguments:

- OUTBUT - the buffer, or vector, to be filled.
- NLINE - the line index (row or column) of the grid to be accessed.
- ITIME - the time (first or second direction) the routine is called.

Subroutine PLT3D

Subroutine PLT3D is a modified version of subroutine PLOT3D, obtained from the Collected Algorithms of CACM. The basic logic is shown in Figure 23. For convenience, portions of the documentation for this subroutine are reproduced here:

PLT3D will accept three-dimensional data in various forms, rotate it in three-space, and plot the projection of the resulting figure onto the X, Y plane. Those lines or portions of lines which should be hidden by previous lines are masked.

Each call to PLT3D causes one line to be plotted. A line consists of a sequence of points in three-space which will be connected using linear interpolation between adjacent points. This sequence of points is sepcified by three sequences of real numbers, the X, Y, and Z components of each point. Each of these sequences of real numbers can be specified either as being equally spaced, and therefore denoted by an initial value and an increment, or as being contained in a real array. There is no restriction that any of the three component sequences be either increasing or decreasing, and the number of points may change between successive calls.

The masking technique used by PLT3D is based on two premises: (1) lines in the foreground (positive Z direction) are plotted before lines in the background; and (2) a line or portion of a line is masked (hidden) if it lies within the region bounded by previously plotted lines. Masking is then achieved by maintaining a visible maximum function and a visible minimum function. Those portions of each line falling within the region bounded by these functions are considered to be hidden. Any line which exceeds user specified limits is truncated without the loss of the plotter origin. A call to PLT3D before initiating a new figure can be used to simulate a line drawn at the bottom of the paper; therefore, only those portions of each line lying above all previous lines will be drawn.

The data are transformed by a three-dimensional rotation determined by two user specified angles. PLT3D assumes a right hand coordinate system with X running the length of the paper, Y running across the width, and Z coming out of it. The figure is first rotated by an angle of θ degrees clockwise about the X-axis. The resultant figure is then rotated by an angle of $\emptyset$ degrees about its Y-axis. The plotted figure is the projection of this final figure onto the X-Y plane. Figure 1 demonstrates rotations about the vertical or Y-axis, and Figure 2 demonstrates rotations about the horizontal or X-axis. Warning: Some rotations will alter the foreground/background relationships between the lines, and thus the order in which they should be plotted to avoid violating the first masking premise.

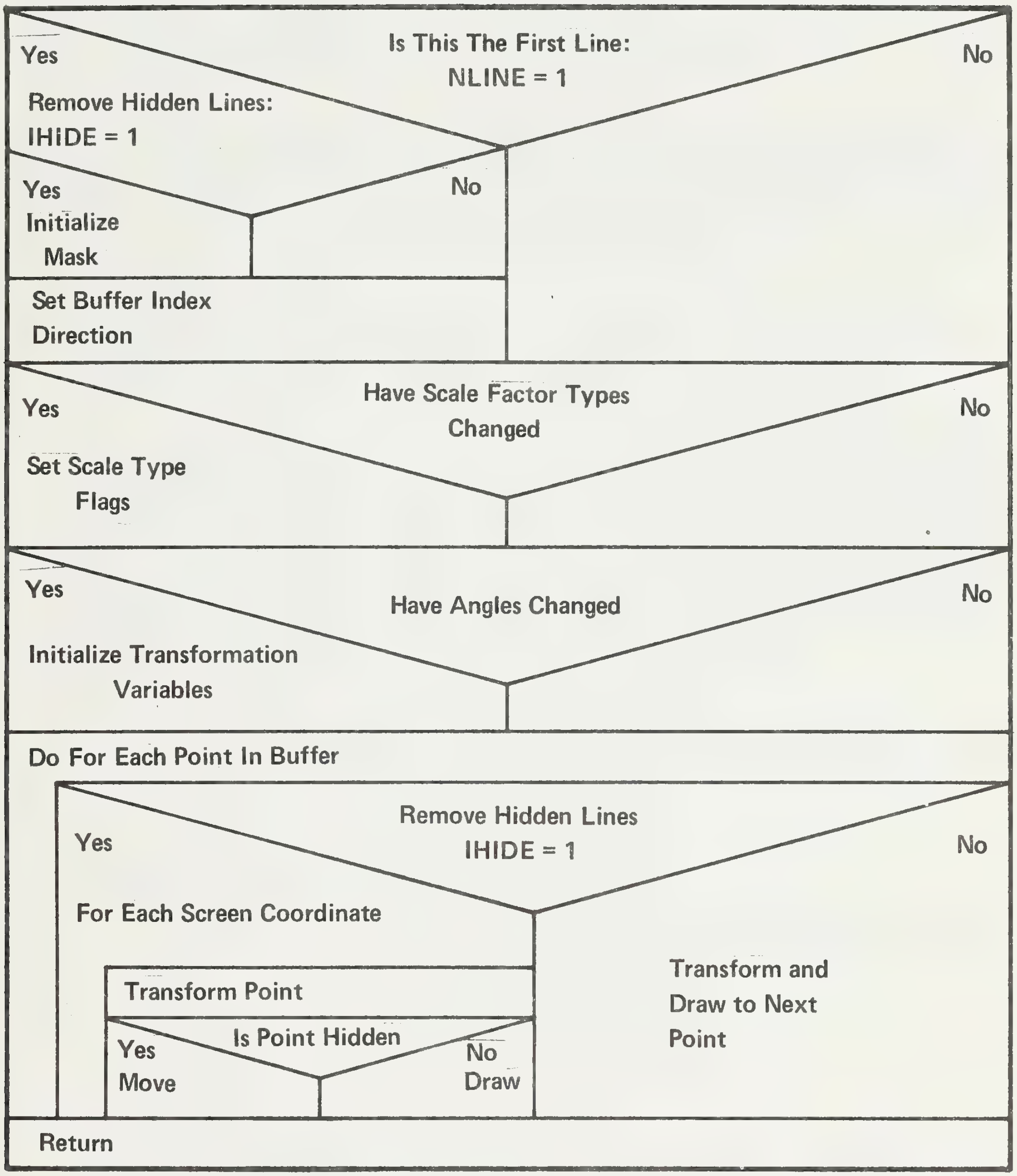


Figure 23.—PLT3D Logic

As an option, the coordinates of the vertices of the figure and the projection of these vertices onto the Y=0 plane of the figure will be returned in a user supplied array. This information can then be used to put a frame on the figure, as is done in the example program, or to connect the endpoints of each line, or to plot axes, etc.

Crosshatched figures are easily obtained as is demonstrated by the example program. Some perspective can be achieved by modifying the data scaling parameters between successive calls. PLT3D attempts to minimize plotter movement by beginning at the alternate end of successive lines.

The input parameters for PLT3D are as follows:

(IVXYZ) is a four digit decimal integer which is used to select various input/output options. These digits, in decreasing order of magnitude, will be referred to as V, X, Y, and Z.

IF V .NE. Ø, the vertices of the current figure and their projection onto the Y=Ø plane, will be stored in a 16 entry real array (VERTEX), and will be updated as each line is plotted. These coordinates are in inches and relative to the current plotted origin. The X, Y pairs are ordered so that the first pair correspond to the last point of the first line, and the following pairs are ordered in a circular fashion. The pairs on the Y=Ø plane of the figure, then follow in the same order. If V=Ø, the vertex parameter is ignored, but should not be deleted.

If X=Ø, the X-components of this line are assumed to be equally spaced, and are computed by

X(I) + XDATA + (I -1) * XSCALE

Where (XSCALE) is a scale factor.

The same relations hold for the Y-components, that is, if Y=Ø

Y(I) = YDATA + (I - 1) * YSCALE

and if Y .NE. Ø

Y(I) + YDATA(I) * YSCALE

If Z=Ø, the Z-components of this line are all assumed to be equal, and are computed by

Z(I) = ZDATA + (NLINE - 1) * ZSCALE

where (NLINE) is some integer associated with this line. If Z .NE. Ø, again we have

Z(I) = ZDATA(I) * ZSCALE

When (NLINE) is equal to one, it indicates the beginning of a new figure. A call to PLOT3D with (NLINE) equal to zero before initiating a new figure simulates a line drawn at the bottom of the page. Therefore only those portions of a line lying above all previous lines will be plotted. All other parameters are ignored on such a call.

(NPNTS) is the number of points on this line, and may be altered from line to line.

(PHI) and (THETA) are the two angles (in degrees) used to specify the desired 3-dimension rotation. The following two definitions of these rotations are equivalent - in terms of rotations of axes, the initial system of axes, X, Y, Z, is rotated by an angle (PHI) counter-clockwise about the Y-axis, and the resultant system is labeled the TUV axes. The TUV axes are then rotated by an angle (THETA) counter-clockwise about the T-axis, and this final system is labeled the PQR axis. The plotted figure is the projection of the original figure onto the PQ-plane. In terms of rotations of coordinates, the figure is first rotated by an angle (THETA) clockwise about the X-axis. The resultant figure is then rotated by an angle (PHI) clockwise about its Y-axis. The plotted figure is the projection of this final figure onto the X,Y plane. Warning, some rotations will alter the foreground/background relationships between the lines, and thus the order in which they should be plotted.

(XREF) and (YREF) are the coordinates, in inches, relative to the plotter origin. To be used as the origin of the figure.

(XLENTH) is the length, in inches, to which the plot is restricted. Any point which exceeds this limit, or the limits of the paper in the Y direction (NYPI), will be set to that limit.

(MASK) is an integer array of 2*XLENTH*PIPI entries which is used to store the MASK. The contents of this array should not be altered during the plotting of any given figure.

All parameters except (MASK) and (VERTEX) are returned unchanged.

Between any two calls for the same figure, any parameter can be meaningfully changed except (XLENTH), (MASK), and (VERTEX).

Several modifications were made to this subroutine for implementation in SEAMPLAN. Tektronix PLOT-10 TCS subroutines MOVAB and DRWAB were used to produce the displays, and so XLENTH, described above, has been replaced with LENPLT. Whereas XLENTH was the plot size in inches used to calculate the required dimension of MASK, LENPLT is the actual dimension which should be equal to the maximum number of screen roster units for the display. Another modification is the addition of the argument IHIDE, which if not equal to zero, is used internally to override the incremental display mode with checking for moves if hidden and draws override. If IHIDE$\pm$0, the routine always draws from one point to the next at an increase in display generation speed, but with a possible loss of display quality for some drawings.

Subroutine FRAMR

Subroutine FRAMR is a modified version of subroutine FRAMER provided with subroutine PLOT3D, obtained from the Collected Algorithms of CACM. The original documentation of subroutine FRAMER is reproduced here:

FRAMR is a routine to plot a frame on the projection of a 3-dimensional figure as drawn by PLOT3D.

IHCOR - Number of the Vertex of the figure which appears to be furthest in the background (minus Z direction).
VERTEX - Array containing the coordinates of the vertices of this figure as returned from PLOT3D on the last call.
MASK - Array containing the mask for this figure as returned by PLOT3D on the last call.

The vertices of the frame are numbered (1-4) in the same order as their coordinates appear in VERTEX. The MASK array is altered by this routine. But the plotter origin is not moved.

Since the same vertex is always in the minus Z direction (see STUP3 and FILBF descriptions) the routine as used in SEAMPLAN is always called with IHCOR = 4. The argument MASK has been eliminated since only those lines completely visible are drawn in the modified version.

Program STUP3

Program STUP3 is scheduled by program TRD to perform set up and initialization functions for 3-dimensional grid displays. Its logic is given in Figure 24. The TRD COMMON block is immediately retrieved from disc. Then, depending on the value of common variable ICODE (IPRM(3)), the user may or may not be required to input viewing position angles. The actual values of these angles are stored in variables OUTPHI and OUTHTA, and will be output exactly as input by the user. PHI, however, is modified to an equivalent angle between zero and 90 degrees, and the variable IQUAD is set to indicate the actual quadrant of the angle input. IQUAD is later used to determine the direction in which the plot buffer is filled (see FILBF descriptions) to allow for a full 360° range of positive and negative input angles.

The user is then requested to input FACTOR, the elevation scale factor. Each point in the grid will be multiplied by FACTOR prior to display to allow the exaggeration (FACTOR > 1.0) or the smoothing (FACTOR < 1.0) of the relief of the surface. The user must then specify whether or not he wants hidden line removal and flag variable IHIDE is set accordingly.

The rotation angles, the elevation scale factor, and the minimum Z value in the grid file are then used to calculate the scale factors XSCALE, YSCALE, and ZSCALE and the offset values ADDX and ADDY which are used by subroutine PLT3D to insure the resulting figure is entirely visible on the screen.

Prior to termination which returns control to program TRD, the COMMON block is rewritten to disc.

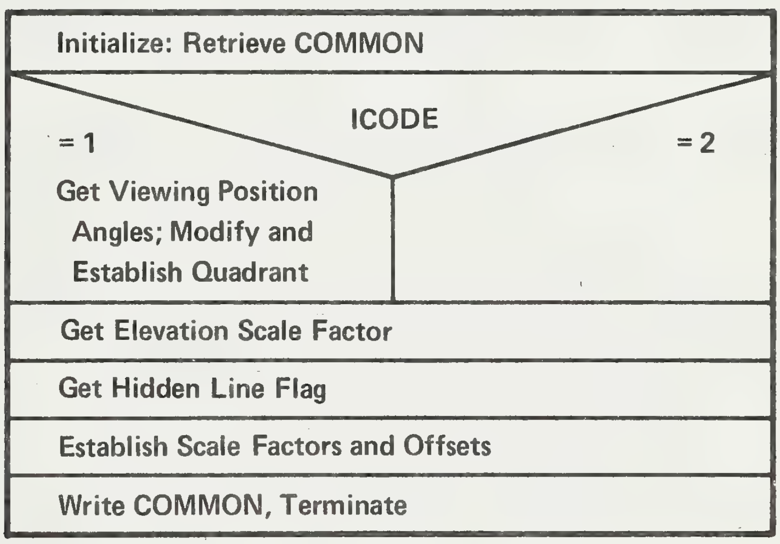


Figure 24.—STUP3 Logic

Program GRDIN

Program GRDIN reads grid files for various calling programs. The logic is summarized in Figure 25. After retrieving the COMMON block from the disc which contains the operation code and optionally the data file name, the routine checks the operation code. If the operation code is nonzero, the name of the file to be read is in the COMMON block otherwise the routine interrogates the user for the name. The file is then opened; if an error occurs on open or if the file type is not equal to 2, the error flag is set. If a grid file is successfully opened, the data is read, the COMMON block is written back to disc and the program terminates. Program characteristics are summarized in Appendix B, and the COMMON block is described in Appendix C.

DMPFL MODULE

The program comprising the DMPFL module of SEAMPLAN provides the user to obtain a line printer listing of either binary or grid files. This routine was modified for the M.S.U. installation from the STAMPEDE package.

The user may obtain line printer listings of either binary and/or grid files. These listings are useful for verification and/or review of data.

Program DMPFL

As is documented more completely in the STAMPEDE Reference Manual (1) DMPFL displays on the line printer the contents of a grid, XYZ, or coefficient file. The capability to display coefficient files was retained, even though none exist in the current system, to allow for future enhancement. The only user input is the file name; it is not necessary to specify file type, since this information is contained in the header record of each file. For further information on file types, see the sections on Binary X, Y, Z data files and grid files (Appendix D). Also, program characteristics are given in Appendix B.

CONDR MODULE

At the present time the CONDR module of SEAMPLAN is merely a submodule of the DGINT module. It provides the user with displays of contour maps generated by vectored data.

This vectored data is generated by using the Tektronix Digitizing Tablet. These same displays can be obtained in the DGINT module.

In the future this module will be modified to overlay the continuous contour maps and the point data displays. This will allow the user to put reference points on the contour displays.

Table 16 summarizes the program segments, associated routines and their function for the CONDR module.

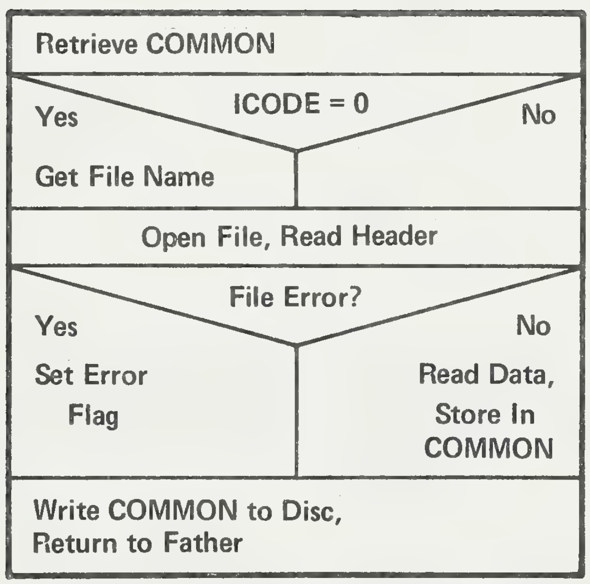


Figure 25.—GRDIN Logic

Table 16. -- CONDR Program Segments

NAME	SUBROUTINES	USE
DGINT	-	Digitizing Control
CONCN	SQUAR, SCALE, OTLN, UPDAT, SWCON	Continuous data digitizing
CONDR	MAPFO, CNTUR	Continuous data drawing
RNDIS	SQUAR, SCALE, OTLN	Random (X, Y. Z) digitization of continuous data
RNDDR	DRAWM	Random data drawing
PTDTA	SQUAR, SCALE, OTLN	Point data digitizing (with symbols)
PNTDR	DRAWM	Draw point data and symbols
SYMED	SCALE, SQUAR, OTLN	Edit point data symbols

Program CONDR

Program CONDR is the drawing routine for the continuous data. CONDR is swapped in by CONCN. This is done either by entering a "6" through the record type options, or by inputing an "S" through the operating instructions of CONCN. Continuous data files are opened, closed, and read by the subroutine MAPIO. All of the actual drawing of the data is done through the subroutine CNTUR.

The map is drawn on the screen in an area of approximately 720 by 720 raster units. The actual area used to draw the map depends directly on the map. The lengths of the axes determine the dimensions of the screen window. The axis with the largest length is assigned a screen length of the largest possible size. The screen length of the other axis is scaled to avoid any distortion and to give the user a maximum viewing area. The map is placed on the screen so that the origin (lower left hand corner of the map) is at the screen location (250,30).

Useful header information can then be placed along the left margin of the screen. This includes such information as the job name, the file name, the minimum and maximum X geographical coordinates, Y geographical coordinates, and contour elevations. This information also contains the grid interval and the constant contour elevation. A key for the map is also displayed. The user may then obtain a hard copy of the map, may zoom in and display only a portion of the map, or may change the value for the constant elevation between contours. If he decides against doing any of these three things, control passes back to the program CONCN.

If the user elects to zoom in on an area, he may also change the constant elevation between contours. The zoom is accomplished by reading the cursor positions specified by the user. The user first positions the cursors at the lower left corner of the area to be zoomed in on, and then at the upper right hand corner. CONDR then draws the area specified using the same techniques described above.

All variables found in the program and in the COMMON block are described in the program. By addition, the reader is referred to the Appendix B of this report for further information.

Subroutine MAPIO

Subroutine MAPIO is the routine which controls manipulation of the continuous data files created by CONCN.

These functions include:

1. opening the data files
2. reading a record from the data files
3. positioning the data file to the first record
4. closing the data file.

These functions are all performed through RTE III FMP calls.

Subroutine CNTUR

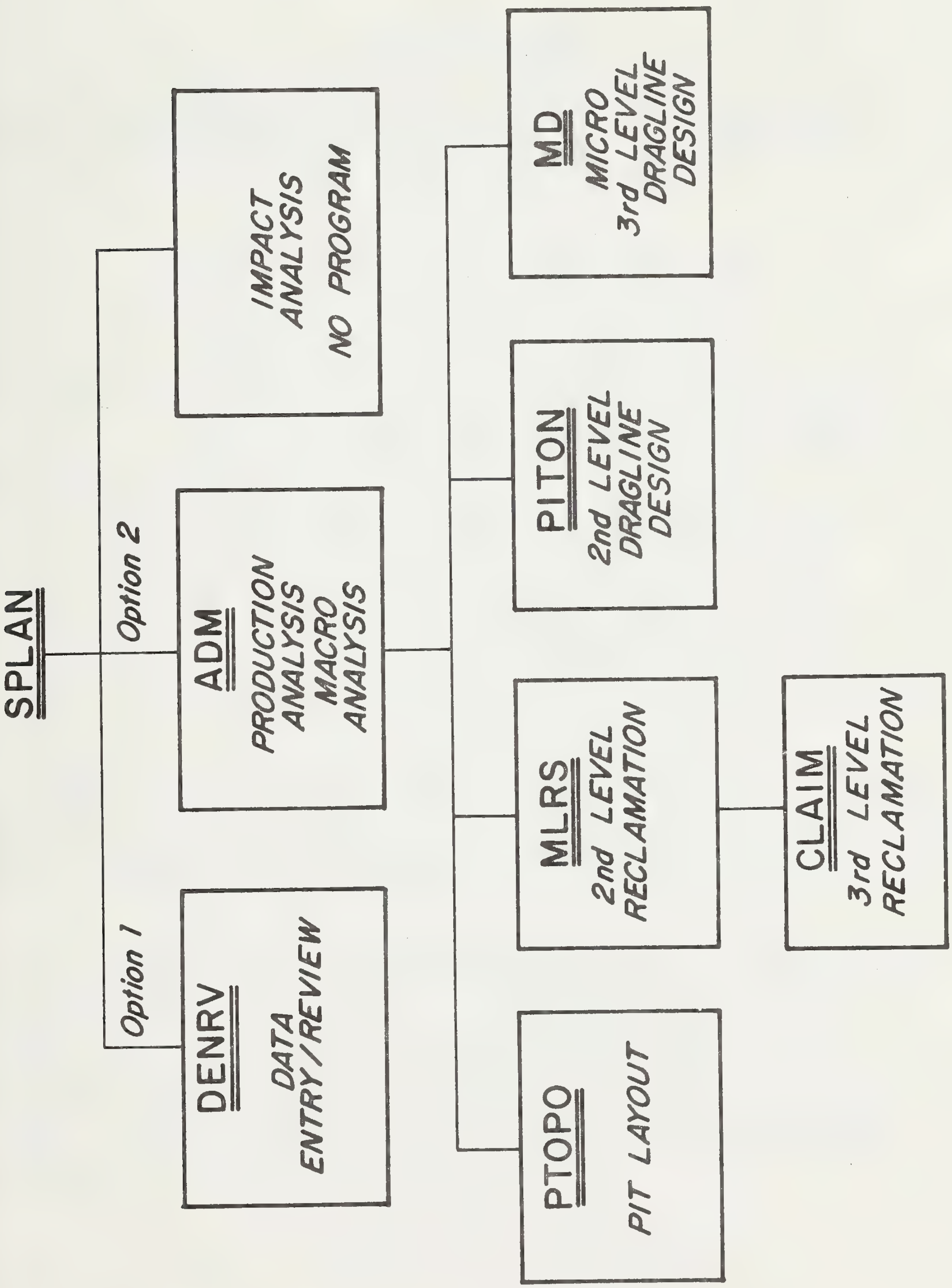
Subroutine CNTUR is designed to draw the continuous data files built by CONCN, and has been adapted from the SKYLOG program (see SKYLOG documentation 3.) CNTUR first reads the header information through a call to the subroutine MAPIO. Consecutive records are then read (through subroutine MAPIO) and drawn.

If the record is a contour record the elevation is checked to see if it is a multiple of the constant elevation between contours. If the elevation is a multiple of the constant interval between contours the contour is drawn, otherwise the record is ignored. The contour is then labelled, making sure that the label does not overwrite any other labels.

The kind of line drawn for the record is determined by the record type. Thus there is a different line type for each of the five different record types. The reader is referred to the Appendices for further information.

PRODUCTION ANALYSIS GUIDE MAP

* SEAMPLAN Modules with Production Analysis Sub-Modules.



GENERAL COMMENTS

The Guide Map shows the general SEAMPLAN program tree and Production Analysis module details. Several submodules are shown under control of a Production Analysis executive. These are summarized in Table 1.

Table 1. -- Production Analysis Sub-Modules

MODULE	DESCRIPTION
ADM	Production Analysis initialization, interaction, control and macro (first order) design module.
PTOPO	Pit Input Module
PITDN	2nd Level Dragline Design Module, executive and interaction
MD	3rd Level (Simulation) Dragline Module
MLRS	2nd Level Reclamation Module
CLAIM	3rd Level (CLAIM) Reclamation Module

Each of these modules represents a logical grouping of programs and subroutines, and will be discussed in this section in detail. The modules have been given the name of the controlling program, or executive, at each level. However, as described earlier, modularization is accomplished on both a program (swap) and subroutine level.

To be consistant with standard FORTRAN and to facilitate conversion of programs to other systems, a semi-transparent swapping scheme has been adopted with the following conventions. In most cases a call to a subroutine which must be swapped results in invocation by the calling program of a "dummy" swapping version of the subroutine. This routine in turn schedules a program. (Usually this program name has an X appended to the subroutine name.) This program then calls the "actual" subroutine (and completes the COMMON and argument linkages. Figure 1 illustrates this where MAIN is an arbitrary calling program and SUB the subroutine which must be segmented for swapping.

```
Program Main
.
.
.
CALL SUB
.
.
.
END
SUBROUTINE SUB
.
.
Write COMMON to Disc
Schedule SUBX Program
Read COMMON from Disc
RETURN
END
```

```
Program SUBX
.
.
Read COMMON from Disc
CALL SUB
Write COMMON to Disc
.
.
END
SUBROUTINE SUB
.
.
"Real" subroutine code
RETURN
END
```

Figure 1. -- General Swapping Procedure for Production Analysis Module

In a few cases, more than one subroutine called directly from the "father" program has been included with a single "son", or swapped, program. In this case, a code is passed to the scheduled program (son) from the invoking program (father) to select the proper subroutine. This is illustrated in Figure 2.

Details concerning disc reads and writes, program scheduling, etc. can be found by reading the EXEC call descriptions (1). In this section only the routines which are part of the application programs are described with the exception of ADMX. Dummy swapping routines are contained in the source file and &ADMS, and as described interfacing programs are in separate files (generally with an X as the last character in the name).

PRODUCTION ANALYSIS MODULES

ADM (MACRO LEVEL) MODULE

Several program segments operate under control of ADM. These segments, together with their associated subroutines comprise the ADM module. This is the first macro logical level of the production analysis module, or the 2nd control level in SEAMPLAN. Table 2 summarizes the various segments comprising this level of the production analysis module.

Table 2. -- Macro Level Production Analysis Program Segments

PROGRAM	SUBROUTINES	FUNCTION
ADMX	ADM, ADMUI, SFLAG	P.A. executive & interaction and output control
ADMØ	BDATA, BDGAA	Simulate a block data COMMON initialization
ADM1	INITZ, DLINZ, CFINZ, PRVAR	Input default COMMON area values from data files
RPTX	RPT	Print summary reports for ADM
DBEX	DBE	Overburden drill and blast model
LRSX	LRS	Reclamation level 1, 2, 3 design control program and level model
QBEX	QBE	Coal drill and blast model
CHSX	CHS	Coal load and haul model
GAAX	GAA	General and administrative expense model
CPFX	CPF	Preparation plant model
DLSX	DLS	Dragline level 1 model
DLS2X	DLS2	Interface routine for dragline level 2 models

```
Program Main
.
.
CALL SUB1
.
.
CALL SUB2
.
.
END
SUBROUTINE SUB1
Schedule PROG (code = 1)
RETURN
END
SUBROUTINE SUB2
Schedule PROG (code = 2)
RETURN
END
```

```
Program PROG
.
.
If Code = 1 Call SUB1
If Code = 2 Call SUB2
.
.
END
SUBROUTINE SUB1
.
.
"Real" SUB2 Code
.
.
RETURN
END
SUBROUTINE SUB2
.
.
"Real" SUB2 Code
.
.
RETURN
END
```

Figure 2. -- Modified Swapping Scheme for Production Analysis Module

Most of the routines comprising the ADM Module were acquired as part of the Fluor Utah package, with modifications made as required. Each of the routines will be described in this section with the amount of detail varying with the modifications made. No attempt is made to describe swapping programs since their format is standard and the purpose simply to interface segmented routines. The user is also referred to Fluor Utah Final Report, Vol. 10, 13, 16 (2,3,4).

Program ADMX

The data sheet in Appendix B summarizes characteristics of ADMX. This program provides the interface to the SPLAN executive. In addition, by calling subroutine BDATA, COMMON is initialized. Since RTE III FORTRAN doesn't allow DATA statement initialization of COMMON variables, assignment statements were substituted. As is apparent in the ADMX listing, BLANK COMMON has been broken into ten distinct blocks.

The first block contains Tektronix TCS (Terminal Control System Library) COMMON as modified for this implementation as well as swapping related variables. The other nine blocks correspond to LABELED COMMON blocks in the original ADM package as released by Fluor Utah Inc. (2, 3,4) and modified for the MSU implementation.

Ideally, these would be converted back to LABELED COMMON blocks. Then a true BLOCK DATA routine could be used to initialize COMMON variables. However, storage limitations at MSU together with the necessity of having all blocks in the ADM subroutine requires that the BLANK COMMON scheme be used in this implementation. (Additional storage needed for addressing variables results in a compiler trap due to symbol table overflow if LABELED COMMON use is attempted.) Conversion to other installations with a true overlay capability would, of course, require conversion to LABELED COMMON blocks.

Subroutine ADM

The ADM routine characteristics are briefly described in Appendix B. This routine is invoked indirectly by the SEAMPLAN executive, SPLAN, by scheduling the ADMX program. ADM provides executive supervision for the production analysis module. Figure 3 illustrates ADM's logic.

Basically, routines are called which cause mine, cash flow, and dragline COMMON blocks to be initialized. Next, variables may be changed in the mine block interactively through a call to the NMLST routine. Having initialized the COMMON areas, ADMUI is called and interaction with the user may result in the execution of pit layout programs, interactive dragline design (level 2), or simulation (level 3) programs, as well as the selection of other subsystems to be evaluated.

Returning from ADMUI, IDNFLG indicates whether or not any mining systems models are to be selected. If there are, output files are opened, variables in each COMMON block are set, and each model selected in ADMUI is invoked as required. Finally, the RPT routine is optionally invoked to print final summary statistics and output files are closed.

Call CFINZ, INITZ, DUNZ to Initialize COMMON Areas

Call NMLST to Change COMMON Area Values

5: Call ADMUI to interact with user regarding mining subsystem selection, pit layout, and dragline selection and simlulation

If IDNFLG (Set in ADMUI) so indicates

- Open output data file
  Initialize macromine models parameters using either dragline determined or default production rates
- Call DBE—Evaluate drilling & blasting subsystem if selected in ADM
- Call DLS—Evaluate dragline macro equations if selected
- Call QBE—Optionally evaluate coal drill & blast
- Call CHS—Optionally evaluate load and haul operations
- Call LRS—If selected, involve reclamation sub-module
- Call CPF—Evaluate Prep. Plant model if necessary
- Call GAA—General & Administrative model
- Call RPT—Print final summary report
- Close output files
- Go to 5

End

Figure 3.—ADM Logic

At this point, ADMUI is again invoked and the user is interrogated as to whether or not he wishes to redesign any subsystem, change pit layout, etc. ADMUI will continue to be invoked and ADM executed until IDNFLG is set to -1 by a proper user response to ADMUI interrogation.

Subroutine RPT

RPT is part of the original ADM programming and generates final summary reports when called by ADM. In the HP implementation, RPT is the only subroutine in the RPTX program segment. One modification which was made to the original ADM was the deletion of the LINE routine. The code is fairly straightforward, with mine life costs produced for each operation independently. Appendix B contains a summary for the routine in SEAMPLAN.

Subroutine CFINZ

CFINZ is part of the ADM1 file initialization program segment. As such, the GVNCFA (Cash Flow Analysis) COMMON block is read from the #VNCFA data file. Appendix B summarizes the routine.

Subroutine DLINZ

As part of the ADM1 program segment, when invoked by ADM, DLINZ reads the #DRAG data file. Data in this file describes the dragline, and appropriate values are stored in the GVNDEC ADM COMMON block for use later. Appendix B contains a summary data sheet for DLINZ.

Subroutine INITZ

This subroutine is part of the ADM1 program segment. Hence, a call from ADM results in a swap of the ADM1 program which in turn invokes INITZ. INITZ itself initializes the general mine area description COMMON block of ADM, GVNADM, by reading the file #VNADM. ENCODE and DECODE are simulated using HP RTE III equivalent codes to set appropriate memory locations. Appendix B contains a summary of the routine.

Subroutine ADMUI

The data sheet in Appendix B summarizes subroutine ADMUI's characteristics. This routine provides the interface between users and the production analysis executive, ADM. Flow within the routine may be quite complex, depending on the status of the logical variable FIRST and the code variable IDNFLG. This logic is diagrammed in Figure 4.

As shown, upon entry to ADMUI the flag, IDNFLG, is checked. If it is equal to zero, ADMUI is being "resumed" following execution of the macro dragline model. This approach is necessary to insure that the proper variables are set in ADM prior to invoking the Fluor Utah macro model. While this may complicate the logic somewhat, it guarantees a minimum of alteration of the original code.

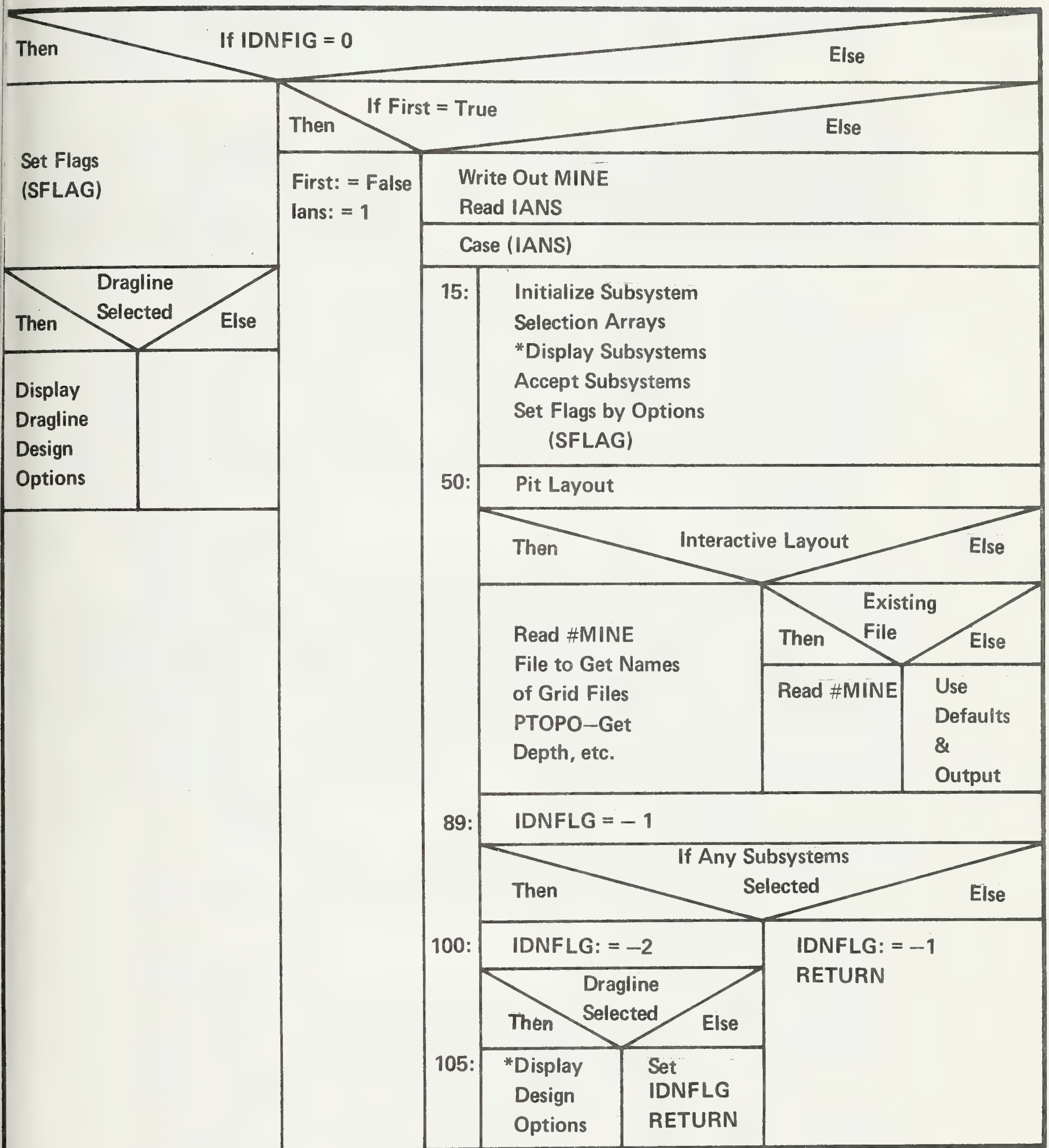


Figure 4.—ADMUI Logic

If IDNFLG is not equal to zero, this entry to ADMUI is not following the macro model evaluation. In this case, FIRST is tested to determine if this is the first entry. If it is, the user is expected to select subsystems for analysis and indicate whether pit layout is desired or not. Otherwise he must respond to the display shown in Figure 4.

Depending on his response, he may (1) select a different set of subsystems and optionally modify the pit layout as in the initial entry (new mine plan), (2) layout a new pit for the existing subsystems (new layout), or (3) terminate production analysis. Termination of production analysis is accomplished by setting IDNFLG to -1 and returning to ADM. ADM in turn tests for a negative value and returns to the SEAMPLAN executive, SPLAN, if appropriate.

Assuming the dragline operation has been selected for analysis, ADMUI will next write the dragline design options to the screen. This display is shown in Figure 7. Again, based on user response, (1) the macro model will be evaluated (through a return to ADM with the proper flags set), (2) DLS2 will be called, which will in turn, call PITDN to access the 2nd level dragline design models, or (3) call the dragline simulation executive routine. Option 3 may only be effected if a dragline has been designated either at level 1 or 2.

Subroutine BDATA

BDATA belongs to the ADMO program segment. This routine is used to mimic a block data type routine to initialize COMMON variables and is therefore, called from program ADMX since its use is peculiar to the RTE III implementation. (HP RTE III FORTRAN does not allow the use of DATA statements for this purpose.) Assignment statements are substituted for DATA statements to accomplish this. All ADM COMMON blocks except the one used by GAA are initialized here, with this initialized by a call to subroutine BDGAA from BDATA. The data sheet in Appendix B summarizes the characteristics of this routine.

Subroutine BDGAA

This routine, called by BDATA, simulates a BLOCK DATA initialization of the GAA (General and Administrative Model) COMMON area. Figure summarizes the routine.

Subroutine DBE

This subroutine, converted unchanged from the original Fluor Utah routine, simulates at the macro level overburdened drilling and blasting operations. The reader is referred to Fluor Utah Inc., Vol. 10, (2) for a detailed description of the equations and variables used.

The logic for DBE is straightforward, with the routine consisting of two blocks. First, the model equations are evaluated followed by output of a summary report to the CRT and, at the user's option, to the line printer. The second block accomplishes output of records to the LFEC

logical unit (FLECRG file) for use by the Fluor Cash Flow Analysis program (3). (Note: CFA, the cash flow program has not been implemented in SEAMPLAN at this time.

Subroutine LRS

The logic of the LRS subroutine is similar to the other ADM macro models. The routine consists of two blocks, the first of which is used to produce a summary report on reclamation equipment requirements. The second block generates output to the FLECRG file for use by the cash flow analysis (CFA) program. The situation is complicated somewhat, however, by changes which have been made at MSU to incorporate second and third levels of reclamation analysis in the SEAMPLAN system.

Basically, after placing a menu on the CRT for the user to select the level of analysis desired, the micro reclamation model, MLRS, may be invoked. It is invoked if the user selects either the second or third levels. The second level is comprised of the Fluor Utah micro reclamation model, while the third level is made up of the CLAIM subsystem. The data sheet in Appendix B documents the essential features of the LRS subroutine. (The reader is further referred to the Fluor Utah Final Reports 10 and 13 for additional information and the program itself (2,3).

Subroutine QBE

The QBE subroutine contains the Fluor Utah ADM coal drilling and blasting routine as adapted for interactive use on the MSU system. The logic in QBE is similar to the other ADM macro models and is divided into two blocks. The first block is used to evaluate the model and output summary tables to the user, first on the CRT and, optionally, on the line printer. The second block accomplishes output of records to the FLECRG data file for use by the CFA program. For a more detailed description of the equations used in the QBE routine as well as the variable definitions the user is referred to the Fluor Utah Final Reports, Vol. 10 and 13 (2,3). Also, see Appendix B for a brief summary of its characters.

Subroutine CHS

The CHS subroutine evaluates the Fluor Utah ADM coal load and haul macro model. The logic of CHS is similar to other ADM macro model routines, and is divided into basically two blocks. In the first block the model equations are evaluated and output to the CRT or, optionally, the line printer. The second block consists of conversion equations and output statements to the FLECRG file. The file is used by the Cash Flow Analysis Routines (CFA). These routines have not been implemented in the MSU SEAMPLAN system as of this date. CHS is briefly summarized in Appendix B, and the user is referred to Fluor Utah Final Report Vols. 10 and 13 for detailed data concerning equations and variable usage (2,3).

Subroutine GAA

The GAA subroutine is used in the Fluor Utah ADM package to evaluate general and administrative expense models. The logic, while similar to other macro models, differs slightly. At the beginning of the program basic equations are evaluated as with the other macro models. But, in this case the cash flow analysis cards are output to the FLECRG file next. Finally, the summary table is output to the user at the CRT and, at his request, to the printer. The reader is referred for further information concerning equations and variable use to Fluor Utah Final Report, Vols. 10 and 13 (2,3). The essential characteristics of the routine are summarized in Appendix B.

Subroutine CPF

The CPF subroutine is used to evaluate the Fluor Utah ADM coal preparation plant macro model. The logic of the routine is similar to other ADM macro model logic with a slight difference in the order of the blocks. Initially, the routine evaluates the basic coal preparation model equations. Next, output is accomplished to the FLECRG file (used by the unimplemented Cash Flow Analysis Program), and finally a summary report is output to the CRT and, optionally, to the line printer. The reader is referred to the Fluor Utah Final reports Vols. 10 and 13 for more detailed definitions of equations and variables. Appendix B summarizes the characteristics of the routine within the context of the MSU implementation (2,3).

Subroutine DLS

The DLS subroutine is used in the SEAMPLAN system to implement the Fluor Utah dragline macro model. As such, the logic is fairly straightforward. Initially, when called from the ADM routine, DLS calls subroutine BTDL to get the boom length and bucket size for the dragline and evaluate hourly owning and operating costs, etc. BTDL actually evaluates boom length and bucket size only if DLS was called with variable IDNFLG set to zero. This indicates that the routine is being called for macro level evlauation. However, if BTDL is called with variable IDNFLG set to one, this indicates that the routine is being called simply to evaluate cost equations for a dragline designed within the second level of SEAMPLAN.

Upon returning from subroutine BTDL the DLS routine computes additional costs and transforms them to annual costs. Finally, if the dragline operation output was selected by the user, the data cards for the cash flow analysis program (CFA) will be output to data file (FLECRG) for the dragline. In addition, if support equipment has been selected for the ADM models additional records are output to the DFA data file to document the required support equipment. Figure 5 illustrates DLS's logic, and the data sheet in Appendix B summarizes its features for the SEAMPLAN implementation. For additional information concerning equations and variable use, the reader is referred to the Fluor Utah Final Reports, Vols. 10 and 13 (2,3).

Subroutine BTDL

Within the DLSX program segment, the BTDL subroutine is called by routine DLS for the purpose of sizing a dragline to the particular mine

BTOL—Get dragline boom length and bucket size, evalute hourly costs, etc.

Compute additional costs

Output dragline operation summary table.

If (LOGDL, EQ, 7)

Output Cash Flow data cards (file FLECRG) for dragline

If (LOGEC, EQ, 7)

Output put dragline support equipment cash flow data cards.

Figure 5.—DLS Logic

site of interest as well as computing dragline owning and operating costs and estimated power requirements. BTDL's basic logic is diagrammed in Figure 6 . Depending on whether or not this routine is called with variable IDNFLG equal to 0 or 1, either all or part of the BTDL subroutine will be executed.

The logic in either case is straightforward. If the design flag variable IDNFLG is equal to zero, this indicates that the invocation of DLS and, indirectly, BTDL has been for evaluation of the macro model. In this case, a rough estimate of the required dragline will be found. In order to do this BTDL will begin by setting up an initial bucket size and boom length followed by a call to subroutine FDLQ. This routine in turn returns the required boom length and bucket size to subroutine BTDL. BTDL then concludes by computing a dumping radius and estimated owning and operating costs for the machine based on the product of boom length and bucket size.

The characteristics of the MSU SEAMPLAN version of BTDL are given in Appendix B. For further information regarding the equations used in BTDL the user is referred to the final Fluor Utah Report Volume 10 (2) and the associated Fluor Utah Dragline Data Book. The equations used in the BTDL subroutine were derived using data in the data book.

Subroutine FDLQ

The FDLQ subroutine is called from subroutine BTDL and is used to iteratively arrive at boom length and bucket size estimates for the dragline macro model. Readers are referred to Fluor Utah Inc., Final Report, Vol. 10 (2) for further information concerning both equations used and the variable definitions.

Subroutine DLS2

The DLS subroutine provides the interface between the Fluor Utah ADM macro dragline models and equations and the second, or interactive engineering design, level models developed at MSU. In order to do this, several variables which have common definitions and usage in the two routines need to be converted before calling PITDN, the second level dragline executive program. Similarly, upon return from PITDN the variables used by the second level models must be reconverted for use by the first level program. Hence, DLS2 contains both the ADM macro mine and dragline COMMON blocks as well as the single pass and two pass dragline model COMMON blocks from the second level dragline programs (see Appendix C).

The logic in the DLS2 routine is straightforward and the characteristics of the program are summarized in the data sheet in Appendix B.

PTOPO MODULE

The PTOPO module performs iterative pit layout with the user. As such, it is a series of map display routines and special programs for extracting information from the mine related grid file. In addition, infor-

If IDNFLG = 0 (Macro Model Selected)

Calculate starting bucket size and boom lengths
for iterative solution;
FDLQ (iterate to find boom & bucket size)

Compute dumping radius, costs, etc.

Figure 6.—BTDL Logic

mation concerning the mine site is saved in the MINE file. Table 3 presents the program segments and subroutines comprising this module.

Table 3. -- PTOPO Program Segments

NAME	SUBROUTINES	USE
PTOPO	ZOOM, BOX (SEE TOPO)	Control
GRDIN	-	Grid file input utility
PTLOT	DRNG, REDRW, LINE CROSS, CRAMER, PUTLN, ADJST	Pit layout interaction
PTFLS	-	Maintains #MINE file for dynamic programming
DPLOT	-	Prepares data for pit layout

Program PTOPO

Program PTOPO is scheduled by the production analysis executive, ADM, for the purpose of performing interactive pit layout. PTOPO is a modified version of TOPO, and performs initialization for CNTRG which draws contour maps, then schedules the routine which actually performs the layout PTLOT. Figure 7 illustrates the basic logic.

The program first retrieves the swapping parameters established by ADM: no COMMON is read. However, the disc track information is used for subsequent swaps. The #MINE file is opened and the header record is read. If this is a first time call (ICODE = 0 as opposed to a redraw call ICODE = 1), the user is asked to select a map to be drawn from those contained in the #MINE information. If this is a redraw case, the index to the previously selected map is contained in word 34 of the #MINE header record. In either case, the grid data file is read by program GRDIN, which is swapped at this point. For a redraw, the ranges or bounds are contained in words 35-38 of the header and the contour interval is in words 39 and 40. If this is a first time execution, the user is asked to provide this information. The windows are then set, and the header information is written. The actual contour map is then drawn by swapping program CNTRG. If this is a redraw, the #MINE file is closed and PTLOT is swapped prior to termination; otherwise the following operations must be performed first: the user may zoom in (ZOOM) and he may change the contour interval. When he is finally satisfied with the zoomed area as well as the contour interval, this information is written to the #MINE file.

The COMMON block utilized by PTOPO is the standard grid COMMON block (see Appendix B) with the following variables appended:

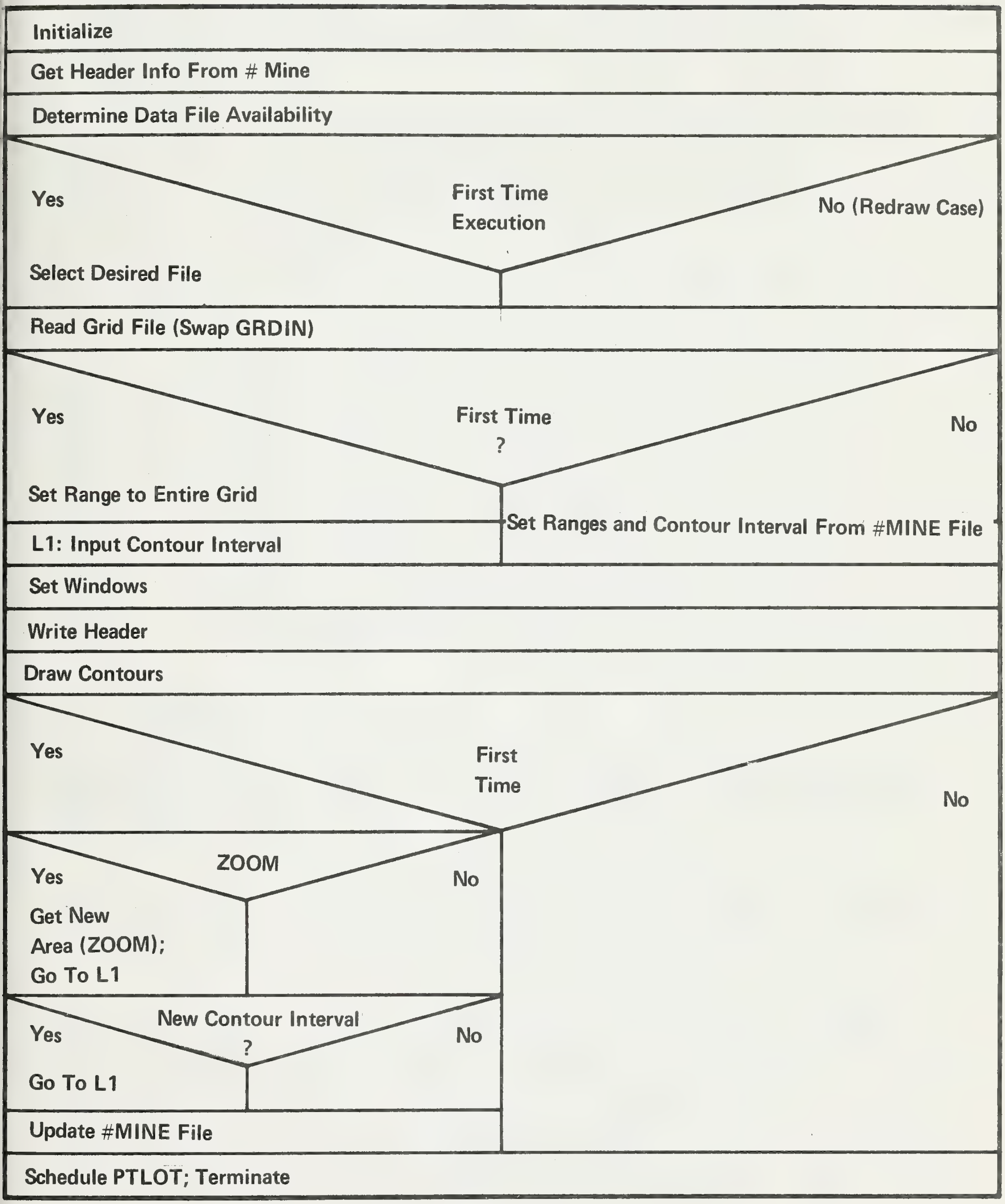


Figure 7.—PTOPO Logic

CINT	The contour interval for the current display
XPIT(4)	The four X coordinates of the current mine area
YPIT(4)	The four Y coordinates of the current mine area
MINREC(64)	The #MINE header record
RECGRD(128)	The current #MINE data record, depending on use, may contain any of records 2-8
MINE(3)	Contains "#MINE" in ASCII
A(4)	The "A" coeffieient of the four equations of the edges of the mine area
B(4)	The "B" coefficient of the four equations of the edges of the mine area
C(4)	The "C" constants of the four equations of the edges of the mine area
IMIN	The minimum I subscript of the mine area
IMAX	The maximum I subscript of the mine area
JIMN	The minimum J subscript of the mine area
JMAX	The maximum J subscript of the mine area
XCENT	The X coordinate of the center of the mine area
YCENT	The Y coordinate of the center of the mine area
FIRST	Logical variable indicating first time execution (TRUE) or redraw (FALSE).

Program PTLOT

Program PTLOT is scheduled by Program PTOPO for the purpose of laying out a mine area on a contour map or for redrawing an existing mine area and drawing pits as designed by production analysis routines. Figure 8 shows the basic logic involved.

Since this is a swapped program, it initially retrieves the PTOPO COMMON block from disc. The #MINE header record is then retrieved. If this is a redraw call, the current status is drawn by subroutine REDRW and if sufficient room remains, the user specifies design range (DRNG).

Otherwise, pit layout proceeds as follows: the user first input the four trapezoid corner points with the virtual cursors. The end points of the leading edge are first requested, then the extents in the direction of mining. This may be done in either a clockwise or counter-clockwise manner; however, if the user inputs the values in some other order, the program reorders them. The area is then outlined by subroutine OUTLN. The corner points are stored in the second record of the #MINE file, the average length and the width of the area are calculated. Subroutine DRNG is called to determine the design range: the distance from the leading edge that is to

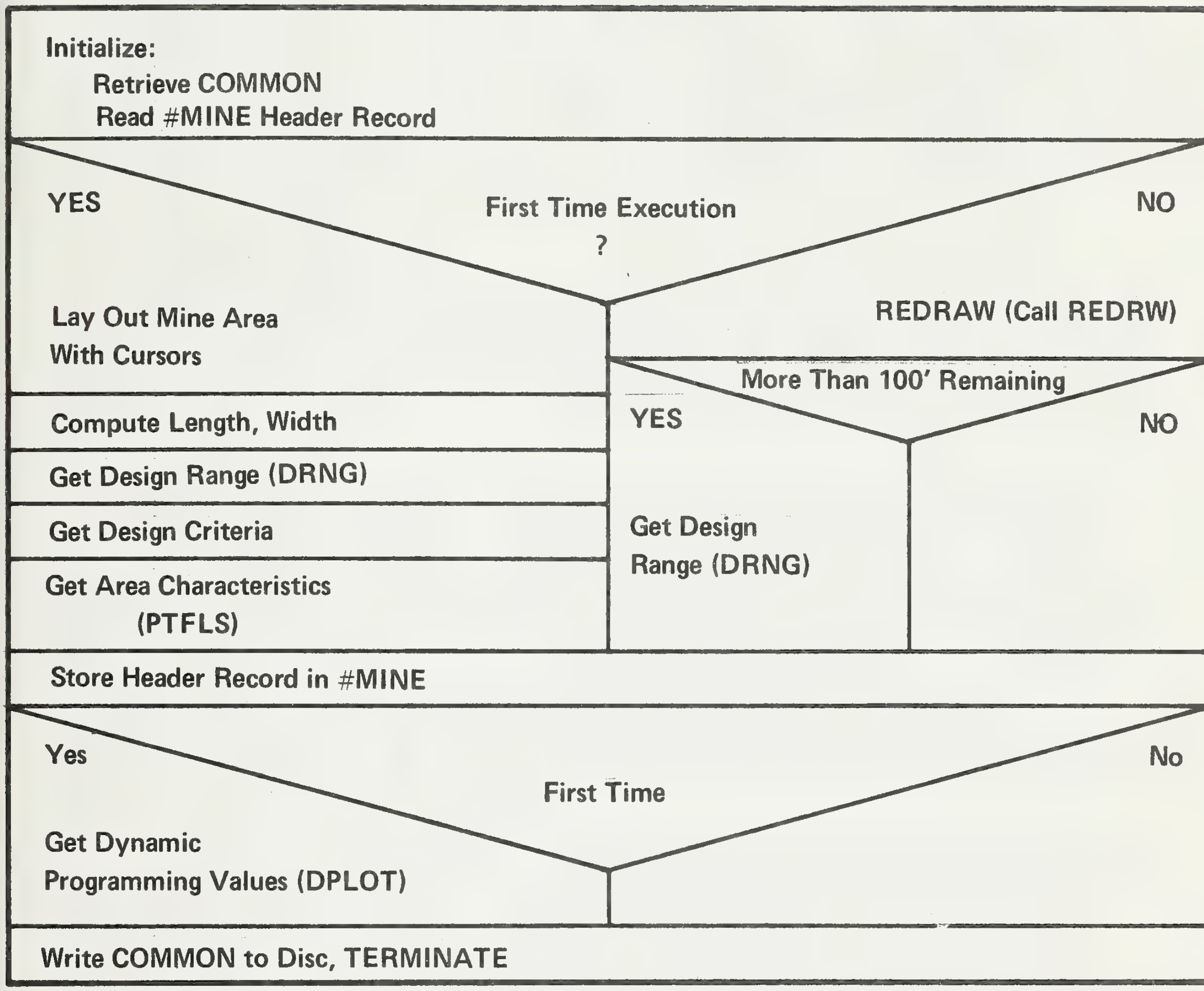


Figure 8.—PTLOT Logic

be analyzed by the production routines. The user is then asked his design criteria: production analysis is based on a values for overburden depth and coal seam thickness. These values can be area averages (ICRIT = 1), values at the point of maximum stripping ratio (ICRIT = 2), or values at a user specified point within the area (ICRIT = 3). This criteria code is stored in the first word of the #MINE header record. Program PTFLS is then swapped in to determine area characteristics. The header record is stored in the #MINE file, and if this is a first time execution, DPLOT is swapped in to determine values needed by the geometric programming routines of the production analysis module. The PTOPO COMMON block is written to disc prior to termination.

Subroutine REDRW

Subroutine REDRW is called by program PTLOT to redraw the layed out mine area and to superimpose the pits which have been designed by production analysis routines. The subroutine uses no arguments, and the COMMON block is the same as that used by PTOPO. Figure 9 illustrates the basic REDRW logic.

Initially, the routine reads the second record of the #MINE file which contains the corners of the mine area previously layed out by the user. The current version allows for only one such segment. However, provisions have been made to facilitate the addition of multiple segment capability. A call to subroutine OUTLN outlines this area. Subroutine LINE determines the equations of the lines (AX + BY + C). If necessary, subroutine ADJST modifies each of these equations to insure that the distance from each of the lines to points inside the trapazoid is positive. This is required so that later when the equations of lines representing the edges of designed pits are determined, the positive distances from the edge can be used.

The pit widths designed thus far are then retrieved by reading the 7th and 8th records of the #MINE file. The number of these pits is contained in the 23rd word of the #MINE header record, and is stored in variable NPITS. If NPITS is negative, there is only one relevant pit width, which is considered to be uniform throughout the mine area. In this case, the actual number of such pits is determined based on the width of the mine area, and all width values are set equal.

With the number of pits determined and the widths established, the equations of the lines representing the edges of each of the pits is determined. Only the constant term is calculated, since the slopes of all such lines are the same as that of the first edge of the mine area. Subroutine CRAMR is used to solve for the points of intersection, which are then connected. AVGS(5), the last edge designed, is updated throughout the drawing process. Control then returns to PTLOT.

Subroutine DRNG

Subroutine DRNG is called by program PTLOT to allow the user to specify the design range of the current pit layout to be analyzed by production analysis routines. This is accomplished through the use of the terminal crosshair cursors.

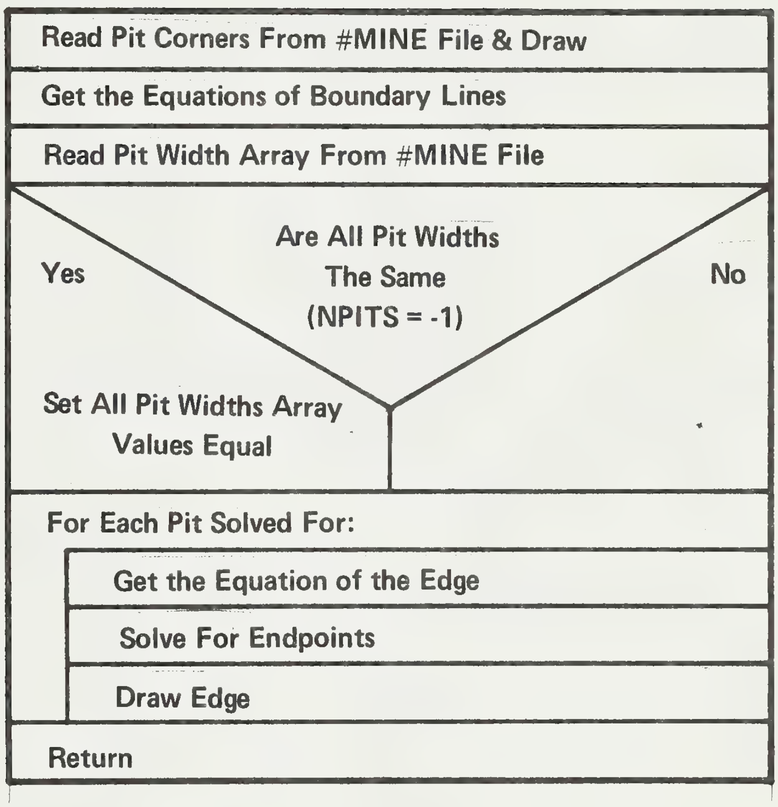


Figure 9.—REDRW Logic

The two arguments of the subroutine IX and IY are simply the absolute screen coordinates of the last user message written and are used for positioning of subsequent messages.

The subroutine prompts the user with a message, then inputs an X, Y location through the use of the virtual cursors. The distance of this point to the leading edge of the mine area is then calculated. If this distance is greater than the width of the area (the user wishes to analyze the entire area, the distance is set equal to the width. Finally, the distance is adjusted to be the distance from the last pit designed. The PTOPO COMMON block is used throughout (see Appendix B).

Subroutine LINE

Subroutine LINE called by program PTLOT calculates the equation of the line AX + BY + C which passes through the points (X_1, Y_1) and (X_2,Y_2). Arguments include:

X_1 - the X coordinate of the first point

Y_1 - the Y coordinate of the first point

X_2 - the X coordinate of the second point

Y_2 - the Y coordinate of the second point

A - the "A" coefficient of the equation

B - the "B" coefficient of the equation

C - the constant term of the equation

Subroutine CRAMR

Subroutine CRAMR is called by program PTLOT to resolve a pair of simultaneous linear equations.

The following arguments are utilized:

A1 - "A" coefficient of first equation

B1 - "B" coefficient of first equation

C1 - constant term of first equation

A2 - "A" coefficient of second equation

B2 - "B" coefficient of second equation

C2 - constant term of second equation

X - returned X coordinate of point of intersection

Y - returned Y coordinate of point of intersection.

Cramer's rule is the solution technique employed.

Subroutine OUTLN

Subroutine OUTLN is called by program PTLOT to draw the trapezoid representing the user specified (with cursors) mine area. The routine is general purpose and will draw any n-sized polygon.

Arguments include:

X - vector of X coordinates of the vertices

Y - vector of Y coordinates of the vertices

N - number of vertices.

Subroutine CROSS

Subroutine cross is accessed by program PTLOT and draws a four faster unit cross. The two arguments, X and Y are the virtual coordinates of the center of the cross.

Program PTFLS

Program PTFLS is swapped by program PTLOT to determine overburden depth and coal seam thickness values in the mine area based on the user-specified design criteria. Figure 10 shows PTFLS's basic logic.

Initially, the PTOPO COMMON block is retrieved. The minimum and maximum grid subscripts are then determined. These are the grid cell indices (stored in COMMON variables IMIN, IMAX, JMIN, JMAX) that index the rectangle within the grid that completely surrounds the layed out mine area. These values will later be used by DPLOT as grids are once again searched. The necessary grid data files are opened. If a single point design is desired (ICRIT = 2), the user selects the point with the cursors. Otherwise, the files are spaced into (to the top of the rectangle) and the points on each row of the appropriate grid files are either summed (for later averaging) or searched for the point of maximum stripping ratio. Having completed this process, the averages are finalized, the files are closed, COMMON is rewritten to disc, and control returns to PTLOT.

Program DPLOT

Program DPLOT is scheduled by program PTLOT for the purpose of producing the records in the #MINE data file dealing with the overburden depth and coal seam thickness values at the point of maximum stripping ratio at 50' intervals throughout the mine area for use by the multiple pit (dynamic programming) optimization programs. Figure 11 illustrates the DPLOT logic.

The program first retrieves the COMMON from disc, opens the #MINE data file and reads the header record. From this information the name of the stripping ratio grid file is determined and that grid is read by swapping GRDIN. The indices of the points of maximum stripping ratio along lines parallel to the leading ledge of the area and 50' from each other are then calculated. The equations of these lines have the same A and B coefficients as the line of the leading edge; only the C coefficient, the constant,

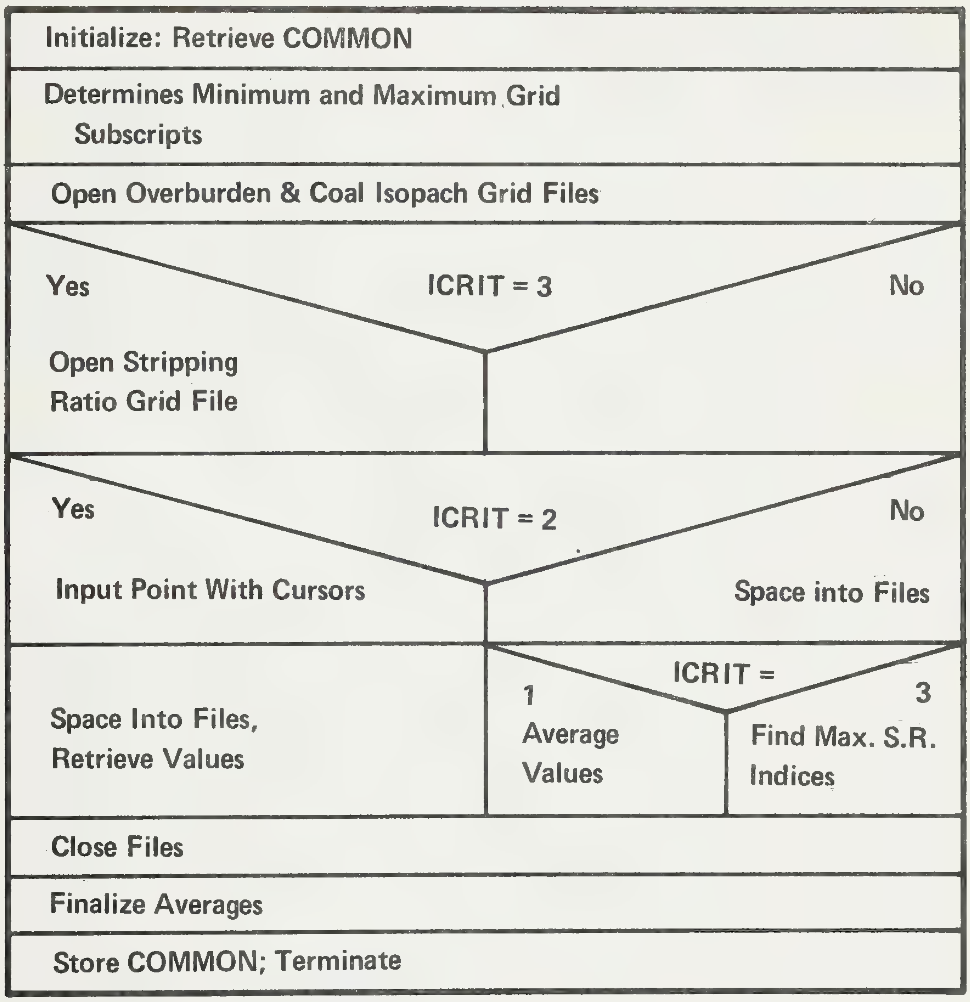


Figure 10.—PTFLS Logic

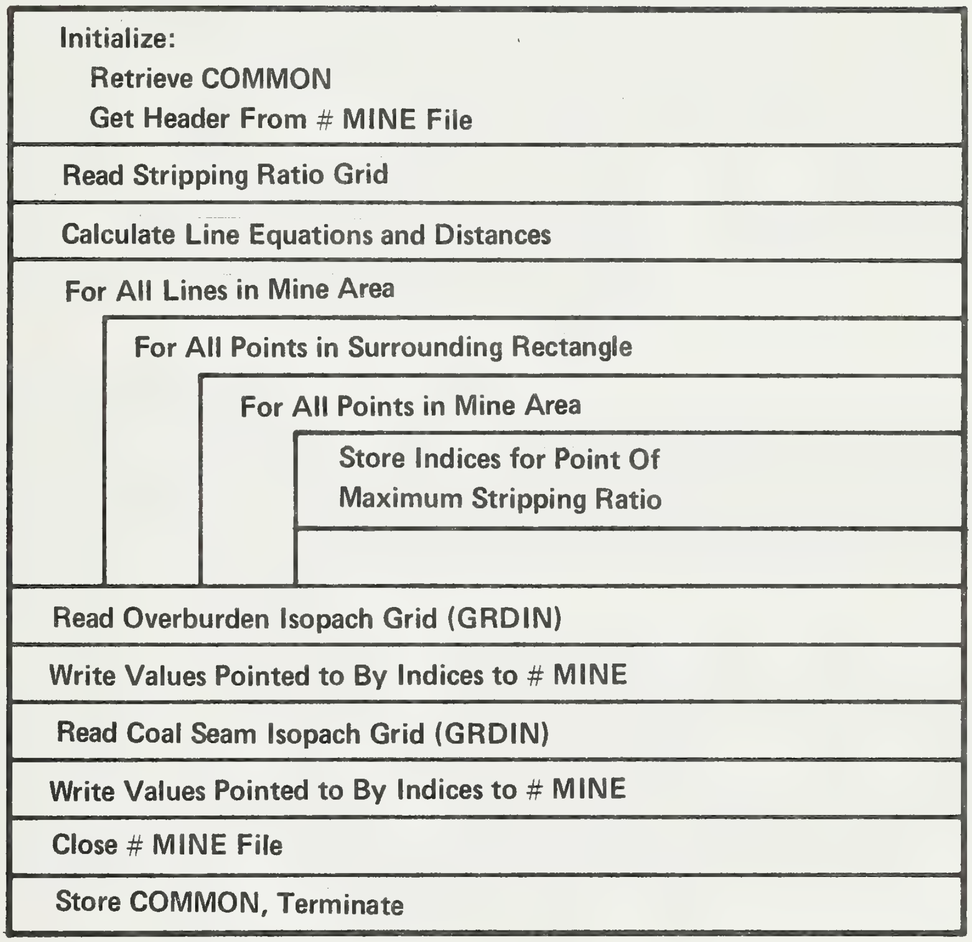


Figure 11.—DPLOT Logic

changes. After setting A1 and B1 the width of the mine area is found as the distance from the line representing the leading edge (using A(1), B(1), and C(1)) and a point on the opposite edge (XPIT(3), YPIT(3)). The number of lines within the area (NLINES) is then this width divided by 50, plus 1. For each of these lines the C value of the equation of the line (C1) is calculated. The entire rectangle within the grid which surrounds the mine area is then scanned. Each grid point is first checked to insure it is inside the mine area. If it passes this first test, it is then checked to see if it is at most 25' from the current line. If so, its value is compared to the current maximum stripping ratio for this line. If it exceeds it, its indices become the indices of the new maximum. In this way, a pair of indices is computed for each of the lines in the mine area and stored in the vectors INDX and JNDX.

The name of the overburden isopach grid file name is retrieved from the #MINE header record and the grid is read by swapping GRDIN. The previously computed indices are used to retrieve those values which correspond to the points of maximum stripping ratio and the values are written to the #MINE file. The coal seam thickness values are similarly retrieved and stored, the COMMON block is written to disc, and the program terminates. The COMMON block used by PTOPO is used by DPLOT.

PITDN (LEVEL 2 DRAGLINE DESIGN) MODULE

The PITDN (Pit Design) Module, as its name implies, consists of programs for interactive design of the dragline and pit. The programs belonging to this module accomplish evaluation of the engineering design (Production Analysis Level 2) dragline models, generate the graphical displays and other output, interact with the user, and perform optimization of the design modules when requested.

This module has been divided into several program segments which accomplish this task. These are summarized in Table 4 . As shown, each segment consists of several subroutines each of which will be described in this section of the report. Communication between routines and program segments is accomplished through several COMMON blocks. These blocks, while all belonging to unlabeled (BLANK) COMMON, in a different environment could become LABELED blocks. Each block used in the PITON module, together with a list of variable definitions is given in Appendix B.

Subroutine PITDN

In the production analysis module the PITDN subroutine performs the executive function for the evaluation of all second level dragline models. Since PITDN functions basically as a controller of flow between other modules, the logic is quite simple. The program begins by calling subroutine USER to obtain an initial design from the user. Next, subroutines FLEX, DIAGR and CNSTR are called consecutively to evaluate the selected model displayed on the CRT and inform the user regarding plan feasibility. Once the feasibility information has been displayed to the user, PITDN places on the screen a second level dragline option menu. Depending on the user's response to this menu, the PITDN routine will return to the invoking program, DLS2, call the routine which performs analytical optimization, ANALY,

or invoke the USER program once again to obtain a plan from the user. The user is referred to Appendix C for information concerning COMMON block variable definition and usage.

Table 4. -- PITDN Program Segments

NAME	SUBROUTINE	USE
PITDX	PITDN, ANALY, USER CNSTR, RSPON	Level 2 dragline models executive and interactive routine
FLEXX	FLEX, START, WRITX, SUMR, FESBL, MODL, DMODS	Manages model initialization, evaluation, and optimization
DPFIX	DPFIO	Reads data for the dynamic programming solution code
PTDPX	PITDP, RETRN, GETD, DMODS	Dynamic Programming code for solving multi-pit problems.
MOD1X	MOD1, TIME, INIT7	2nd level single pass dragline model
MOD2X		2nd level 2 pass dragline model
DIAGX	DIAGR, DRWPL, DRWXS, TRACK, HUB, DRAGL, BOOM, VERB	Draws the dragline casting diagrams
EBNCX	EBNCH, DRSPL, ROTAT	Draws MINE portion of casting diagram
DSGNX	DSGNC	Write out casting diagram verbage
CMP7X	CMP7	Performs geometry calculations for casting diagram display

Subroutine ANALY

The ANALY subroutine is invoked by PITDN in order to set up variables and invoke programs which will perform nonlinear programming optizimation. ANALY logic is straightforward, and involves initially interrogating the user regarding the objective function for the design optimization to be used and the decision variables to be included in the model. Next, ANALY, using information from the initial plan, the default dragline data file, and previous user specifications sets variable flags and decision variable pointers for use in the optimization process. Finally, ANALY invokes the FLEX routine with a code indicating that optimization is to be performed. Once the FLEX routine completes the solution of the nonlinear program, routines DIAGR and CNSTR are invoked to display the optimal design in the form of a casting diagram and inform the user concerning the design feasibility. The user is referred to documentation of the single and two pass

dragline models as well as the Appendices for further definitions of variables and pointers.

Subroutine USER

The USER subroutine is called from the PITDN executive in order to interrogate the user regarding a desired plan. The user is queried initially as to the basic mining method (one or two pass) to be used. Further information regarding pit dimensions, the use of side benching and top of coal fender options is next obtained. Finally, the dragline characteristics are input as a result of user queries as well as information regarding dragline purchase price, production rate, etc. Several of the values which are input can be specified as zero. For example, the dragline price may be specified zero and user uses it as information to set bits in the RMDL mask which will later be used to determine appropriate decision variables should optimization occur. IMDL is also used directly in the models to determine in some cases which values are input parameters to the models and which values must be derived by the models. For further information concerning variable usage and COMMON block variable definitions, the user is referred to a single and two pass dragline model documentation as well as the Appendices.

Subroutine CNSTR

The CNSTR subroutine is called by both ANALY and PITDN to evaluate the feasibility of a current plan. This is done by checking all constraints and values stored in the array RLOC for negative values. CNSTR works through all possible constraints with the appropriate constraint set depending on the IMDL mask, to determine which constraints have been violated. When a constraint violation is detected, routine RSPON is called with the appropriate broad classification code and an index which indicates the particular constraint broad classification code which has been violated. The user is referred further to the discussion and description of the RSPON subroutine as well as the one and two pass models documentation for further information.

Subroutine RSPON

The RSPON subroutine is called by CNSTR to output information to the user on the Tektronix CRT concerning the feasibility of current plan. The logic in RSPON is very simple and is concerned with decoding the IAREA and INDEX variables passed as arguments to determine which write statements to execute. The write statements are divided into two blocks, one for single pass and another for two pass models. Each of these blocks are further divided into blocks for the possible IAREA values. These values depend on a broad classification of the infeasibility detected, and within each IAREA block the index argument determines the particular write statement which must be executed for the proper response. For further information the user is referred to CNSTR documentation available documentation for the one and two pass dragline models, and the Appendices.

FLEXX Program Segment

The FLEXX program segment is called as part of the second level dragline design module in order to evaluate the 1 and 2 pass dragline models

as well as to perform the nonlinear programming optimization. The actual code comprising the nonlinear program solution algorithm has been borrowed from Himmelblau (5). Only minor changes were made to the original code, and three subroutines were added during the process of integrating the algorithm with the SEAMPLAN system. The most significant changes made to the original code include the renaming of the main flexible tolerance routine to FTOL, the elimination of input in this routine, and the addition of an argument, IMOD, to several of the flexible tolerance subroutines.

The routines which have been added are FLEX, MODL, and DMODS. These routines were added in order to accomplish interfacing with the second level dragline design control program segment, PITDN, as well as the models. In addition to calling the models directly, the flexible tolerance routines may indirectly call the models through a dynamic programming subroutine, PITDP. This routine is used to optimize designs over several pits and under conditions including varying overburden depths and coal seam thicknesses. No attempt is made in this report to fully document the original routines, and the user is referred to Himmelblau (5) for information concerning the basic algorithm, etc. However, the three routines which have been added for the purpose of interfacing will be described in detail here.

Subroutine FLEX

The FLEX subroutine, as alluded to in the previous section, performs an interfacing function within the second level dragline design module. That is, when FLEX is called it may invoke (1) the flexible tolerance nonlinear program solution code, (2) the one or two pass dragline stripping model, or (3) the dynamic programming algorithm. As mentioned, invokation of and interfacing with the dynamic programming algorithm is accomplished indirectly through the flexible tolerance programs. The logic of subroutine FLEX is straightforward and is diagrammed in Figure 12.

Upon entering the FLEX subroutine, several variables are initialized for use by the flexible tolerance solution code. Next, the option code, ICODE, is tested for less than zero, and if it is less than zero the models routine is called with a code of 0 indicating that an independent data file is to be called to initialize and evaluate the model (valid for one pass model, MOD1, only). This particular option allows FLEX, and hence the dragline model, to be run independently for evaluation of specific designs which can be coded into a data file used by the model. If ICODE is not less than 9, and this is the case when the routine is called when running SEAMPLAN, the model is simply initialized by calling the MODL routine with a code of 5 (the COMMON block having been initialized in the DLINZ and INITZ routines). Next, the option code is tested, and if it is not equal to 2 the decision variables are initialized and the user is asked to input convergence criteria and step values for the flexible tolerance code.

Once these values are input, the variable IVAR is tested using a logical AND operation. If the third bit has been set (in subroutine ANALY subroutine) the dynamic programming algorithm will be invoked when MODL is called by the Flexible Tolerance routines in order to optimize over multiple pits.

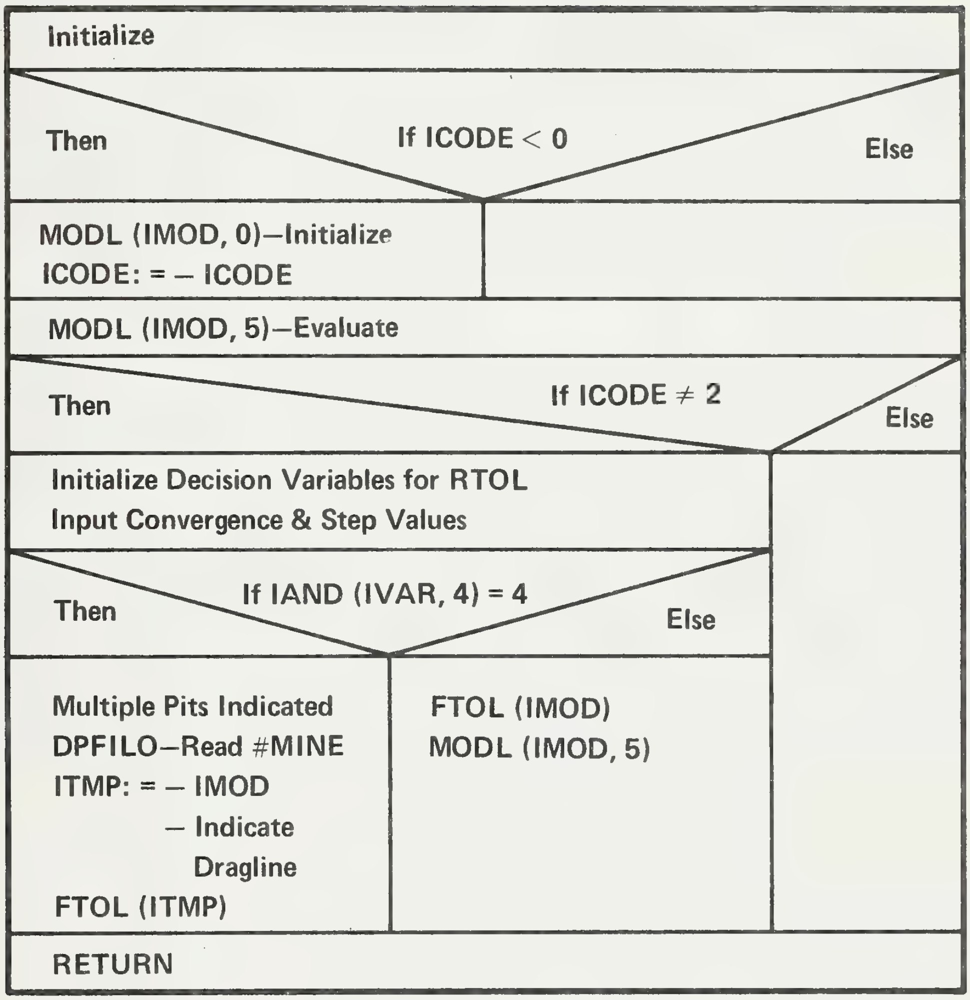


Figure 12.—FLEX Logic

Also, DPFIO must be called prior to FTOL to read the #MINE file and initialize the necessary variables for performing dynamic programming optimization. The #MINE file is created partly in the ADUMI routine (ADM program segment) and partly in the PTOPO program segment when the user elects to perform interactive pit layout. Once the dynamic programming variables have been set, FTOL is once again invoked, but with the model code set to a negative value to indicate that dynamic programming should be performed as an intermediate step between the flexible tolerance algorithm and the model evaluations. Finally, when optimization is completed, in the case of dynamic programming, the DPFIO routine is invoked in order to complete the #MINE file by writing optimum pit widths.

Should the user not be performing dynamic programming optimization (multiple pit design), or upon completion of the normal optimization algorithm, a return is effected to the calling routine (PITDN or ANALY). The FLEX routine's attributes are presented in Appendix B. The user is referred for further information to the documentation of both the one and two pass dragline models (MOD1, MOD2) as well as the entire SEAMPLAN documentation and Himmelblau (5).

Subroutine DPFIO

DPFIO is used as an input/output utility to read and write records from the #MINE file as part of the dynamic programming multiple pit optimization algorithm. When called with a code of one, DPFIO initializes the DPTH and THK arrays to contain coal seam thickness and overburden depths which were stored in #MINE during pit layout (see DPLOT documentation). Assumming the dynamic programming is used during the optimization phase of the dragline design, once DPFIO has loaded these two arrays, control returns to FLEX which together with PITDP accomplishes dynamic programming. Following conclusion of the dynamic programming and flexible tolerance decomposition, DPFIO is once again called to write out to #MINE file the optimal pit widths which were found. For additional information, the user is referred to documentation on the pit layout program series (PTOPO module) as well as the Appendices.

Subroutine PITDP

PITDP is called as part of the optimization strategy aimed at finding optimal dragline design over varying coal seam thickness and overburden depth for multiple pits. As such, PITDP implements a standard backward recursion dynamic programming optimization algorithm. The logic of the routine itself is somewhat involved and is summarized in Figure 13 As shown, PITDP consists of basically three major blocks of code. The first block is used to initialize the dynamic programming variables used Also, in this block checks are made to see if the flexible tolerance program is calling PITDP to evaluate an internally new design at that level or simply to return additional information concerning the current design. If additional information is all that is required, an immediate return is affected to the FLEX program block.

(Divides Into 3 Major Blocks—Initialization, Backward and Forward Recursion Blocks!)

*Initialization

1. Check to see if D.P. needed (or new values needed by FLEX for game plan!)
2. Estimate NSN (no. of states, stage N)
3. I = N

   NSI = NSN

*Backward Recursion (stage by stage evaluation . . .)

While I > 0 do

> Call RETRN—Evaluate Optional Width Vector for Stage I
>
> If I > 1
>
> > Save decision vector
> >
> > Set $W^*_{i+1,k} \leftarrow W^*_{i,k}$ Stage i becomes i + 1.
> >
> > Etc.

*Forward Step to Recover Optional Strategy.

Set-Up For 1st Stage (last pit) I = 1, si + 1 = W plan, ki + 1 = 1, NSi + 1 = 1

220: While Si + 1 > 0 and I ≤ N do.

> Si = Si + 1
>
> Ki = Ki + 1
>
> Get Optional Decision and Return for Stage I
>
> Get New Si + 1, Ki + 1, NSi + 1
>
> Set Wpit
>
> Evaluate Return and Constraints for These Two Pits!

Output Optional Times (FφPT) and Decisions

Figure 13.--PITDP Logic

The second major block implements the first part of the actual dynamic programming algorithm. In this block the RETRN routine is called repeatedly to evaluate decisions made at each stage for each possible state. As such, RETRN returns vectors of optimal decisions for each possible state at a particular page. Once these optimal decisions for each possible state are available, PITDP begins execution of the third block in the program. In this block, the program begins with the first stage of the last design pit, and iterates through all stages in a forward manner calculating overall optimum pit widths. This block concludes with the output of the optimal times and decision vectors. The reader is referred to the listing of the program itself, as well as the Appendices for additional information concerning variable definitions, etc.

Subroutine RETRN

Subroutine RETRN is called by PITDP during the backward recursion phase of the dynamic programming optimization scheme. RETRN is used to evaluate the return fucntion for each possible state at the stage given. It does this by calling the dragline models and returning the calculated time for mining the current pit. The logic of the routine is fairly straightforward and is summarized in Figure 14. Basically, RETRN is comprised of two nested DO loops, one which iterates over the possible states for the current stage (KI), and the second iterating over the possible decisions for a particular state and stage (J). Upon initiating the outer loop, the current stage is set and the optimal return at that state is set to an extremely large number. The second loop is involved with setting current cut widths, obtaining coal depth and coal thicknesses, and calling the dragline model for each possible decision. Also, in this loop several strategies which have been experimented with are implemented for handling constraint violations. Currently strategy 3 is being used. Finally, the inner loop concludes by storing the optimal decision (width and associated return for a particular stage (I), state (K), and decision (J) the entire subroutine terminates and control is returned to PITDP when optimal values have been found and stored for each possible state for the current stage.

Subroutine GETD

Subroutine GETD is called both from PITDP and RETRN to perform linear interpolation between observed coal seam thickness (THK), and overburden depths (DPTH), to find a depth and thickness at a particular point. To do this, GETD uses a linear interpolation approach.

Routine MODL

The MODL routine is called by the flexible tolerance algorithm subroutines, and calls either PITDP or DMODS depending on whether the argument IMOD is positive or negative. If IMOD is negative, it is set to a positive value temporarily and the dynamic programming routine, PITDP, is called in order to optimize over several pit widths. If, however, IMOD is positive, this indicates that FLEX is in control of the optimization entirely, and the models should be called directly. In this case, routine DMODS is called with IMOD and ICODE being passed as arguments for selection of the proper

```
Do KI = 1, NSI        (No. of States Loop)
    Set SI, current state, FSKI ← 1E25
    Do J = 1, NW
        Set Current Cut Width (Decision Value) for Model Evaluation
        Get Depth & Coal Thickness (D, T) at Current State
        Evaluate Model
        Implement Constraint Handling Strategy!
        Set FIJK, Cumulative Objective Value, Stage I, Decision J, State K.
        If (FIJK < FSKI, (FSKI = Optional for Stage I, State K)
            FSKI ← FIJK
                          Set Optional Value
            WSKI ← W
    Store Optional Decision and Return for State K in the Vector.
```

Figure 14.—RETRN Logic

dragline subroutine model (1 or 2 pass) and the use respectively. The data sheet in Appendix B summarizes the attributes of MODL.

Subroutine DMODS

Subroutine DMODS is called by either the PITDP or MODL routines in order to effect an evaluation of the one pass (MOD1) or the two pass (MOD2) dragline models. As such, DMODS passes to these models the necessary code to determine the type of evaluation to be made within the model. Appendix B contains a data sheet which summarizes the characteristics of DMODS.

Subroutine MOD1

Subroutine MOD1 implements the single pass dragline models in SEAMPLAN. As such, several one pass mining methods may be evaluated including simple side casting, side benching and fill benching as well as any combination of these methods. The general modeling approach used in MOD1 is described in Ed Moodey's working papers (6) . The logic of this routine is straightforward, and is summarized in Figure 15. Basically, the routine consists of five blocks. Block 1 is responsible for initializing the parameters used in the model, and this may optionally include reading the #MOD1 data file through a call to routine INIT1. Following this optional initialization and the possible loading of the X vector with values passed from the flexible tolerance nonlinear programming search algorithm, other parameters related to the geometry are initialized prior to computations.

Computations begin in Block 2, where the cross-sectional areas associated with the spoiling from each of six possible positions is completed. These computations begin with the calculations of the spoil area. If this area is greater than zero, some rehandle is indicated, and the extended bench geometry must be included in the model. Next, the extended (fill) bench area is computed and this computation is conditioned on either a positive rehandle requirement or the selection of extended or fill bench mining method by the user. Following this, areas and dumping points are computed for each of the positions.

The third block is used in MOD1 to compute the dragline X, Y locations. In addition, the cut length is set here in such a way as to be the maximum length consistent with dragline locations. Since dragline locations are primarily determined by the spoiling arc of the dragline and the associated volume in each cut, the approach used to arrive at dragline position and cut lengths is interactive. That is, an initial estimate of the cut length is made followed by calculation of dragline positions which by definition may modify the cut length maximum which is possible. Whenever the cut length is changed, all positions computed to that point must be recomputed for the new cut lengths. This process continues until satisfactory positions and cut lengths are arrived at.

The fourth block in this routine is used to calculate production rate and bucket sizes. The calculations actually performed in a particular run depend on the particular constraints placed on the design by the user. These constraints involve dragline purchase price, operating hours, and production rate.

Initialization, Block

If ICODE < 0

Call INIT1—Initialize from #MOD1 File

5: If ICODE $\neq$ 5

Set X Vector to Flexible Tolerance Values.

17: Complete Parameter Initialization

AREA and G-sub-i Calculation

Calculate Necessary Rehandle

If A4 > 0 or Extended Bending Selected

Set IMDL Mask

Calculate Extended (Fill Bench) Area if Appropriate—AE

Position 3A—Side Bench Material Spoiled to Fill Bench (A3A, 63A)

Position 3B—Side Bench Material Spoiled to Spoil Pile (A3B, 63B)

Position 1A—Key Cut Mat'l Spoiled to Fill Bench (A1A, 61A)

Position 1B—Key Cut Mat'l Spoiled to Spoil Pile (A1B, 61B)

Position 2—Main Cut to Spoil Pile Position (A2, 62)

Position 4—Rehandling Position (Fill to Spoil) (A4, 64)

Dragline Location and Cut Length Calculation

80: Get Initial Length (l) value.

810: for i = 1A, 1B, 2, 3A, 3B, 4 do

Get yi, xi

If Xi < Safe Go To 810

If L > Side Bench Indicates

L = Min.

Go To 810

Production Rate & Bucket Size Block*

Depending on Various Constraints on the Design

(Purchase price, production rate, operating hrs),

calculate, explicitly, dragline parameters.

Evaluate the model as a non-linear program

Go To (100, 200, 300) ICODE

100: Evaluate Equality Constraints (None)

Evaluate Inequality Constraints

Evaluate Objective

Hours = Time 1 (B)

Get Cost Per Ton

Get Dragline Cost

Figure 15.—MOD1 Logic

The final major block of the program gets down to the business of evaluating the nonlinear program. In this section, depending on the value of the code, ICODE, any or all sections may be evaluated. The first section evaluates equality constraints from MOD1. If there are no equality constraints, however, this section must be included for the flexible tolerance algorithm. The second subsection in this block is used to evaluate inequality constraints of which there are several. The third section of the performance evaluation block is used to evaluate the objective function selected. This objective may simply consist of the hours to spoil an area or the cost per ton of coal uncovered, however, both the total hours to spoil the design area as well as the production rate and cost per ton of coal uncovered are computed as measures of productivity. In addition, an estimate is made of the purchase price for the dragline selected. TIME1 is used to return the total time to spoil the area. This time includes walk time. The reader is referred to the Appendices for further information.

TIME1 Function

The TIME1 function is called by MOD1 to calculate the time to completely strip the designated design area. While the logic may at first appear quite complex, it is straightforward. The stripping times (dig plus swing and walk times) are estimated optionally for each possible position. Once individual total times are available for each position, these times are summed and extrapolated over the entire area. The general approach to computing stripping times is to calculate an average swing angle which is defined as the angle from the centroid of the cut area to the dump point, and then use this angle as well as area dimensions and dragline size to compute a total stripping time for a single cut. For more information the reader is further referred to the Appendices.

Subroutine INIT1

INIT1 is called by MOD1 when FLEX (Flexible tolerance) and hence MOD1 are run in a stand alone mode, independent of the SEAMPLAN system. When this is the case, INIT1 reads the data file (#MOD1) to load the model COMMON block with the appropriate parameters. By selecting various stripping methods and parameter values, the user may evaluate designs without going through the entire SEAMPLAN system under this scheme. The reader is referred to the Appendices for more information, to the INIT1 listing for an interpretation of the required input.

Subroutine MOD2

MOD2 is used to evaluate the two pass dragline model. The logic while quite complicated has been documented in detail by Sattoriva (7). In most cases MOD2 follows the general modeling approach used in MOD1. As such, the routine consists of several well defined blocks of code with each block documented in its own appendix in Sattoriva (7). MOD2 calls several subroutines to compute various geometry parameters. In addition,

the TIME routine returns stripping and walk time values when called. For more information concerning variables and equations, the user is referred to the Appendices. Details concerning the model equations are given by Sattoriva (7).

TIME Function

Function TIME returns stripping and walk times to the MOD2 routine. The logic is straightforward, with first pass times being computed initially, followed by second pass time. Next, the total times for each pass are computed as well as total dig times and walk times separately. Finally, the total stripping time is summed and returned. The user is referred to Sattoriva's thesis (7) for details concerning the time calculations, which primarily center around the use of average swing angles computed using centroids and spoil dump points. In addition, information concerning variable definitions and routine basic characteristics are given in the Appendices.

FYB23 Function

FYB23 is called by MOD2 to compute the centroid of the fill bench cross-sectional area. This routine is fairly short. However, the equations are quite complex, and the reader is referred to Sattoriva (7) for details concerning the equations used. Further information is also available in the Appendices.

Subroutine SPCNF

SPCNF is called by MOD2 as part of the rehandle geometry calculations. As such, the variable DELTAC is computed and returned. For details concerning the equations used, the reader is referred to Sattoriva (7). Additional information is given in the Appendices.

Function FNCQD

Function FNCQD is a utility used by the MOD2 program segment. Given the parameters for a second order polynomial equation, this routine will return the positive route using the binomial theorem. The routine is called from both MOD2 and SPCNF, and details of the use of these routines are given by Sattoriva (7).

Subroutine AHAT

AHAT is a short subroutine called by MOD2 to return general spoil pile geometry values. Since as the spoil pile accumulated the equations to compute spoiling points, etc. are generally the same, the same basic equations can be used in this routine. For details concerning spoil geometry calculations, the user is referred to Sattoriva (7).

Subroutine DIAGR

The DIAGR subroutine is called in order to produce casting diagrams

on the graphics CRT. The one and two pass model COMMON blocks provide general geometric parameters which are used to compute the various vectors which are needed to draw the casting diagrams. The logic of DIAGR is straightforward. First, subroutine CMP7 is called in order to compute the necessary geometries for the casting diagram. It is here that the PTARR array is loaded with reference points on the screen which are used in all phases of the casting diagram production. Following the call to CMP7, DSGNC is invoked in order to display on the left hand side of the casting diagram verbal information describing the design. Once this information has been written to the screen, a third subroutine, DRWPL, is called in order to actually draw the casting diagram. The reader is referred to documentation for the MOD1 and MOD2 routines as well as the Appendices for further information concerning DIAGR.

Subroutine DRWPL

Subroutine DRWPL is called by DIAGR to actually produce the graphical portions of the casting diagram display. DRWPL logic is straightforward. Initially, virtual and screen windows are defined for the Tektronix CRT, and the box which surrounds the plan view portion of the casting diagram is drawn on the screen. Next, relying on reference points stored in the PTARR array by CMP7, the spoil piles and old and new highwalls are drawn. The slopes on both spoil piles and highwalls are shaded by a call to the SHADE routine. Next, subroutine EBNCH is called in order to calculate stripping method dependent geometry values and draws extended and side benches if necessary. Finally, XY locations are computed for the dragline at the various locations, and subroutine HUB is called to draw these locations and mark the dumping arcs for each. Finally, subroutine DRAGL is called in order to draw the dragline at the main cut position. Once the plan view is complete, subroutine DRWXS is called to manage production of the cross-sectional view of the casting diagram. The user is referred to the MOD1 and MOD2 routine documentation and the Appendices for further information.

Subroutine DRWXS

DRWXS is called in order to draw the cross-sectional view of the casting diagram display. The logic of the routine is straightforward, and begins by defining virtual and screen windows and outline area on the screen in which the cross-section is to be displayed. Next, the line delineating top of overburden and new highwall are drawn on the cross-section followed by display of key cut and coal separation lines. Subroutine VERB is called to label the coal as such. Next, subroutine HUB is called to draw the hub of the dragline on the cross-section view followed by a call to DRAGL which draws the remainder of the dragline. DRWXS concludes when a call to EBNCH which draws in extended and side bench lines and using dash lines, marks and labels the various insitu materials location in the spoil pile to the left. The reader is referred to the MOD1 and MOD2 routine documentation as well as the Appendices for further information.

Other Casting Diagram Routines

Various routines are called both from DRWPL and DRWXS to perform specialized drawing functions. These routines are listed in Table 5 together with their use or uses depending on the origin of the call. Each

of these routines is briefly summarized in Appendix B, and for variable definitions and more information concerning models the user is referred to documentation on the MOD1 and MOD2 subroutines as well the other Appendices.

Table 5. -- Casting Diagram Utility Routines and Use

ROUTINE	DRWPL USE	DRWXS USE
TRACK	-	Draws dragline track (foot)
HUB	Swing Arcs & Dig Position marks	Draws Dragline hub
DRAGL	Draws Dragline	Draws Dragline
VERB	Labels Spoil Pile as such	Labels coal seam
ROTAT	Draws end of spoil arc	-
SHADE	Shade spoils & highwall	-
BOOM	Called by DRGL to draw boom (both views)	-

Subroutine EBNCH

Subroutine EBNCH is called by either DRWPL or DRWXS. This routine produces drawings of the extended and side benches for both plan and cross-section views of the casting diagram. As shown in Figure 16, the logic to perform these functions is straightforward. Initially, EBNCH must compute the necessary mine geometry parameters, and the equations used for this purpose must be consistent with the dragline model equations for which the casting diagram is being drawn (see MOD1, MOD2 documentation). Next, a variable which indicates whether a plan or cross-section view is desired is used to branch to the appropriate block of code. In either case, IMDL is tested to determine which mining method is being used and extended and/or side bench geometries are drawn on the casting diagram depending on these tests. In the cross-section view section, the spoil pile marking and labeling is also accomplished by EBNCH through calls to the DRSPL routine. For a summary of the characteristics of EBNCH, the reader is referred to Appendix B and the data sheet for this routine. Variables and equations used are further defined in the documentation for the dragline model routines (MOD1, MOD2) as well as Appendix C.

Compute Mine Geometry

Go To (100, 200) IVIEW

100: Plan View

If Extended Bench Used

Draw Plan View of Fill Bench

If Side Bench Used

Draw Plan View of Side Bench

RETURN

200: Cross-Section View

If Extended (fill) Bench Used

Draw X-Section View

If Side (Working) Bench Used

Draw X-Section View

Mark Spoil Pile Material Location—DRSPL

RETURN

Figure 16.—EBNCH Logic

Subroutine DRSPL

DRSPL is a concise routine which marks and labels spoil materials in the cross-section view of the casting diagram spoil pile. As such the logic is straightforward. DRSPL is summarized in Appendix B, and the reader is further referred to Appendix C and documentation for MOD1 and MOD2 routines for initial information concerning variable definitions.

Subroutine DSGNC

DSGNC is called by DIAGR in order to produce verbal design descriptions for the casting diagrams. As such, the majority of the subroutine consists of FORMAT and WRITE statements. For a summary of the characteristics of DSGNC the reader is referred to Appendix B and the data sheet associated with this routine. Also, the dragline model COMMON block definitions are given in Appendix C.

Subroutine CMP7

Subroutine CMP7 is called by DIAGR in order to load the PTARR array. This array contains the locations of several standard virtual screen reference points used in producing casting diagrams. In order to determine these reference points, CMP7 must evaluate several of the dragline design geometry equations, consistent with the dragline models (MOD1, MOD2). The reader may refer to documentation on the dragline model routines (MOD1, MOD2) for a description of the equations used in CMP7, and the Appendices for further information.

MD (MCDONNELL DOUGLAS) SIMULATOR MODULE

GENERAL

The McDonnell Douglas simulator module is an adapted version of the program developed by McDonnell Douglas Electronics as part of a U.S. Bureau of Mines sponsored project (8). This program, in its original form, included capabilities to: (1) simulate dragline simple side casting, side benching, and fill benching stripping methods, (2) simulate spoiling to and movement of a hopper-conveyor system, (3) plot on a Versatec plotter the status of mining at various points, and (4) automatically generate alternative designs. Of the total package, the full dragline simulation capability has been implemented. Due to highly system dependent code in the plotting and alternative generation programs, no attempt was made to implement them. Also, since hopper-conveyor systems are experimental at this time, the capability was not included.

The subset of routines adapted and their relationship to one another is shown in Figure 17. Since each routine is documented in McDonnell Douglas (8) no attempt is made here to describe them. Instead, emphasis is placed on modifications made to the program and routines added. Table 6 summarizes the routines added. Each will be described in detail.

Table 6. -- Subroutines Added to McDonnell Douglas Simulator

NAME	PURPOSE
SWTCH	Switches ADM (macro) COMMON to McDonnell Douglas Simulator Variables
NH(I, J)	Accesses element I, J in the NH virtual array
PUTNH (NHIJ, I, J)	Stores value NHIJ into element I, J of the NH virtual array

IMPLEMENTATION ON THE MSU SYSTEM

Due to the memory limitations of the MSU H.P. computer, the McDonnell Douglas program has to be segmented similar to the rest of the SEAMPLAN production analysis module. However, in this case the program segments were named to reflect their hierarchical relationships. Again, each segment name corresponds to a "dummy" main program which handles COMMON communication and general "systems" tasks. Similarly, calls to subroutines residing in different program segments actually are made to "dummy" routines whose source is in file &MUDT1. The sole purpose of these routines is to schedule or "swap" the proper segment containing the "real" routine. (See the description of swapping under H.P. RTE III at the beginning of Production Analysis Module description.) Figure 18 shows the control relationships between the segments formed by aggregation of routines, and Table 7 summarizes each. The next section describes changes and additions to specific routines made within this organizational framework.

RTE III system COMMON is used on the MSU system for communication of Tektronix COMMON as well as swapping and array segmentation information within this module. MD is scheduled from ADMUI in a manner similar to the DLSX (macro) and PITDX (level 2) programs. Three McDonnell Douglas programs had to be changed, however, to accomplish this:

1. MD (EXDRG)
2. MD2 (DATA)
3. MDD (DRAG).

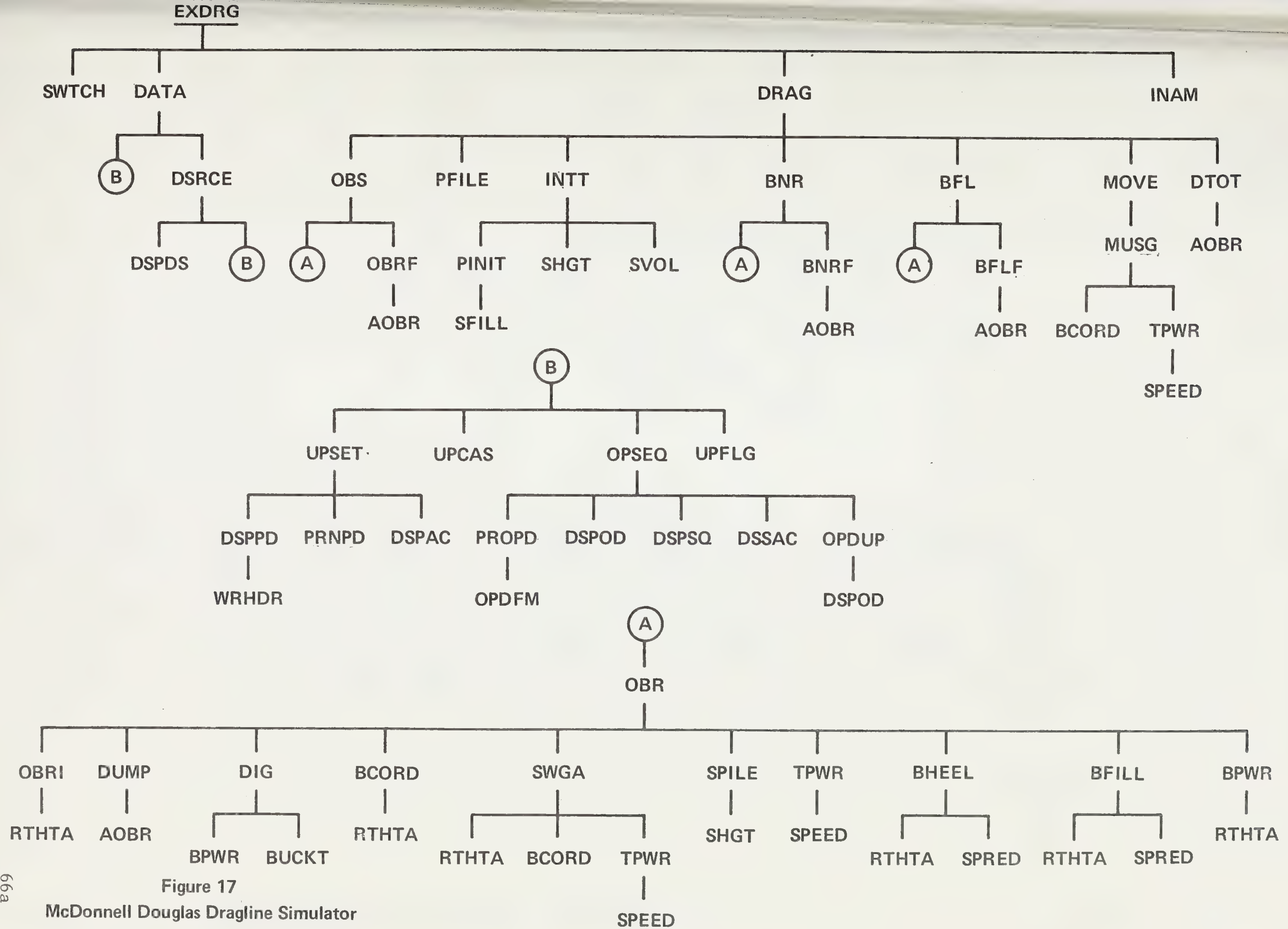


Figure 17
McDonnell Douglas Dragline Simulator
Subroutine Tree (MSU Implementation)

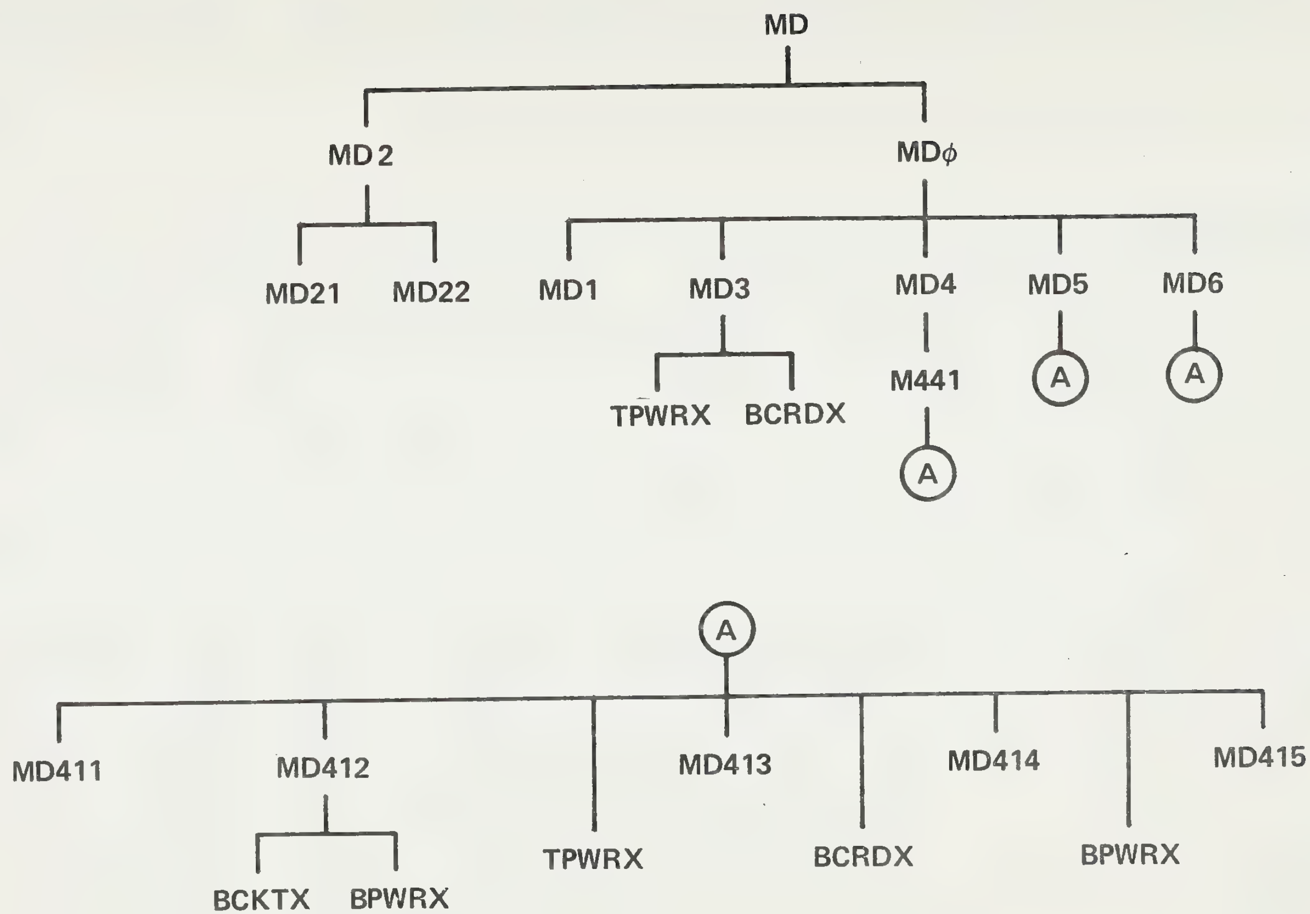


Figure 18.—McDonnell Douglas Simulator Program Segment Tree

Table 7. -- McDonnell Douglas Simulator Program Segments

SEGMENT	SUBROUTINES & FUNCTIONS	PURPOSE
MD	EXDRG, INAM, SWTCH	Simulator executive, user and ADM interfacing
MDØ	DRAG, DTOT, PFILE, AOBR	Operations executive, totals output and save output.
MD1	INTT, PINIT, SFILL, SVOL, SHGT	Initialization and grid set-up
MD2	DATA, DSRCE, DSPDS, UPFLG, UPCAS	Update and display data
MD21	OPSEQ, PROPD, DSPOD DSPSQ, DSSAC, OPDFM OPDUP	Update/Display operations data
MD22	UPSET, DSPPO, PRNPD, DSPAC, WRHDR	Update/Display parameter data
MD3	MOVE, MVSG	Simulate MOVE operation
MD4	OBS, OBRF, AOBR	Simulates overburden removal operation
MD41	OBR, SWGA, SPILE, SHGT, RTHTA	Stripping operations simulation controls
MD411	BFILL, SPRED, RTHTA	Bench fill dumping control
MD412	DIG	Simulates overburden removal
MD413	OBRI, RTHTA	Initializes for OBR
MD414	DUMP, RTHTA	Determine bucket dump location
MD415	BHEEL, SPRED, RTHTA	Simulate bucket heeling
MD5	BNR, BNRF, OBR, SWGA, SPILE, ADBR, SHGT, RTHTA	Simulates bench removal
MD6	BFL, BFLF, OBR, SWGA, SPILE, AOBR SHGT, RTHTA	Simulates bench fill operation
BCKTX	BUCKT	Determines if a load is available for an operation.
BCRDX	BCORD, RTHTA	Generates bucket tragectories
TPWRX	TPWR, SPEED	Gets time & energy for bucket move
BPWRX	BPWR, RTHTA	Gets load and heel power usage

The calls in DRAG to INAM and DATA were moved to EXDRG, and INAM itself was changed to allow command file specification and hence completely automated execution. This was in preparation for linkage to the ADMUI routine, since the file must exist. In INAM the correct command (source) file (#MDS1, #MDS2, #MDS3, #MDS4) is selected depending on the method used when MODE equals 1.

MODE = 1 ⇒ calling from ADMUI

-1 ⇒ independent execution of MD

MTHD = 1 ⇒ simple side casting

2 ⇒ side bench method

3 ⇒ extended bench (no side bench)

4 ⇒ extended and side bench

Variables were also added to ADM COMMON blocks for communication purposes, and in DRGDN IMTHD (or MTHD) was set depending on IMDL (stripping method work). CUTL and HBD were also set there and are initialized through the ADM KVN data file. Subroutine SWTCH was also added to the MD program file for the sole purpose of switching ADM variables

(COMMON blocks GVADM AND GBDEC
↓ ↓
data files #VNADM and #DRAG)

to the corresponding MD variables (blocks A1DLP...etc.) and is called when MODE equals 1. McDonnell Douglas may still be run in a stand alone mode by the command RUN, MD, -1. In this case changes in INAM make possible the use of a command file or interactive parameter setting or both.

ARRAY SEGMENTATION - NH AND PUTNH ROUTINES

The McDonnell Douglas simulator requires a significant amount of computer memory, both for program and data storage. As mentioned, this is a problem on the MSU system, and the general solution with respect to program segmentation has been described previously. The data storage solution is somewhat more involved, and required segmentation of the NH array which is used to store overburden grid status information. The magnitude of the problem is adequately discussed in McDonnell Douglas report (8).

The basic approach used for solution at MSU was to segment the array with a 3K (3072) work segment residing in memory at any one time. The general procedure used is summarized below. Note, system available COMMON (BLANK) was used for all swapping and array segment storage, eliminating the need to read and write this COMMON from disc during swaps. Hence, concurrent running of other programs using system COMMON could cause execution errors.

1. Use two subroutines (source in utility file and MDUT1)

   FUNCTION NH (I,J)

   a. This function retrieves values from NNH (virtual NH array)

   b. Array is as needed at reference time

   c. A segment is loaded from disc when needed.

   SUBROUTINE PUTNH (NHIJ,I,J)

   a. This subroutine is called to insert values

   b. Into NNH, the current segment is written

   c. To disc and the segment containing the I, J

   d. Element read if necessary.

   In code subroutine for

   NH (I,J) = expression

   NHIJ = expression

   Call PUTNH (NHIJ,I,J).

2. Perform Linear Mapping NH → NNH by row since successive accesses will probably increment J first.

3. Dimension NNH(3072) (linear NH) ⇒ store two segments per track Current dimensions (120 X 140) ⇒ 3 tracks.

4. Derive track and sector for segment read based on segment # as follows (64 word sectors):

   NSEG = 2

   ISEG = referenced segment #

   NNHDIM = 3072

   ISCTSZ = 64

   XNSEG = NSEG

   ITRK - NNHTRK - IFX(ISEG/(XNSFG - .01))

   ISCT = (ISEG - NSEG * IFIX(ISEG/(XNSEG = .01)) -1)*NNHDIM/ISECTSZ

   NSEG = # of segments per track

   NNHDIM - 3072 = # of words/segment

   ISCTSZ = # words/sector

5. IMPLEMENT:

   Search all references to NH and replace

   Delete NH dimensions and from argument and dummy lists.

MLRS MODULE

This module consists of one program, MLRS, which controls both 2nd and 3rd level reclamation analysis, when such analysis is requested by the user. This module links the Fluor Utah Final Report Volume 16 (4) micro model and the CLAIM package (9) to the macro level production/ reclamation analysis module in SEAMPLAN. Swapping conventions observed in the rest of the production analysis module were not followed here, and system dependent code resides in the body of the programs.

Program MLRS

MLRS controls the 2nd and 3rd level reclamation analyses. Also, in conjunction with CLAIM routines, MLRS evaluates the 2nd level equations. The basic program is that developed by Fluor Utah, Inc. as the ADM (area dragline) reclamation micro model (4).

Details concerning modifications made to the original logic are given in the CLAIM module section of this volume, and the basic flow is summarized in Figure 19. First, MLRS uses the RTE routines RMPAR and EXEC to read the macro reclamation (LRSX segment) COMMON block from disc. Next, the #VNLRS, #VNSEG, and #VXTITL files are read to initialize default parameter values.

Interactive updating of the default parameters in file #VNLRS are initiated through the use of NMLST. Area dimension, using KAC settings, and scraper parameters are computed. Parameters are passed to program RCLAM for dozer spoil regrade computations, and the values returned are checked for adjustments to scraper requirements. Control is then returned to MLRS, and final output is generated prior to terminating and returning to LRS.

CLAIM MODULE

The CLAIM (9) module provides ADM with a third, more comprehensive, level in the Production Analysis modules reclamation subsystem. LEVEL 1, or the MACRO level, required only minor changes, while LEVEL 2, the Fluor Utah MICOR level, has been revised to include a user selected land use reclamation alternative based on user specified post mining topography and CLAIM analysis of a typical Northern Great Plains rangeland site.

The CLAIM (LEVEL 3) system analyzes user input environmental data to determine an environmental feasibility ranking (FEASI), a techniques and economics list (TECON), and optimum use factors (OPUSE) for the five CLAIM defined reclamation alternatives. The FEASI ranking is based on "expectation of success" values associated with each environmental response category. These integer values range from zero (impossible) to four (mandatory). Cost estimates for the TECON list are developed from an environmentally determined selection from the Master List of Techniques (MLT). The MLT defines reclamation procedures normally required to reclaim any Norther Great Plains mining site to any of the five land use options. OPUSE factors are computed by evaluating both FEASI rankings and TECON costs.

Initialize: Retrieve Common From Father (LRS)
Input Default Parameters: Read Files # VNLRS, # VNSEG, # VTITL–
Implement NMLST routine to allow user definition of # VNLRS variables
Use KAL setting to determine reclamation acreage.
Calculate scraper requirements for topsoil removal & respread
Calculate spoil regrade parameters (swap to RCLAM) Test for scraper adjustments
Output results → pass # scrapers & dozers & revegetation costs to LRS–

Figure 19.–MLRS Logic

Level 1 (LRS) and LEVEL 2 (MLRS) were revised to maintain consistency between the reclamation costs determined by CLAIM, and the reclamation totals estimated by the upper two levels. Specifically, the two non-simulated items, land management and general dozing, were removed from the reclamation subsystem.

CLAIM recognizes a distinction between "environmental control" and "reclamation," and properly groups these two items under the former. Since the Production Analysis module does not contain an environmental control subsystem, these user input, cost per acre values are not considered in the current ADM system. In addition, the term "revegetation" has been replaced with the more restrictive term "planting," since this more accurately describes the costs calculated under this category.

This section documents the basic capabilities of CLAIM, details regarding its interface to the rest of SEAMPLAN, and the program segment which accomplishes this, RCLAM. The reader is referred for specifics concerning inputs to CLAIM to the CLAIM data book and Users Guide (9). Details concerning CLAIM routines accessed by RCLAM are given in a separate volume.

Level 2 Versus Level 3 Reclamation Analysis

Planting costs for the LEVEL 2 analysis were determined using the CLAIM data file describing a typical Northern Great Plains rangeland site. These data are summarized in Table 8 and are presented in full under "SAMPLE OUTPUT." Planting costs for the LEVEL 3 analysis are based solely on the user's environmental data and itemized in the TECON list. When LEVEL 3 is initiated the total planting cost summarized in the LEVEL 1 output reflects all costs not associated with topsoil management and grading statistics. This may include non-planting items such as animal fencing.

The LEVEL 2 analysis always computes scraper data for removing and respreading all topsoil. LEVEL 3, however, evaluates both topsoil and subsoil parameters for possible adjustments to the scraper calculations passed from LEVEL 2. These adjustments may:

1. Increase scraper needs for removal and respread of subsoil in addition to topsoil,

2. Increase scraper needs to accommodate a topsoil/subsoil blend, or

3. Eliminate the need for scrapers because of special handling of seedbed suitable spoil.

The LEVEL 2 summary headings combine both topsoil and subsoil under the heading "topsoil" except when 3 occurs, in which case dozer statistics only are presented.

Required User Inputs

For the LEVEL 2 analysis the user is required, after execution of the NMLST routine, to describe the topography of the post-mining area for each of the land use reclamation alternatives. As an aid to the user, a table is presented (on the CRT) containing recommended slopes, and the percent of the area to be covered by those slopes. The user may use the recommended slope/percent pairs, modify them, or describe the area according to his own specifications - provided he adheres to the restrictions outlined by the CLAIM system. After completing the topographical description, a summary table is presented displaying both grading and planting costs for the five land use options. The user then selects the post mine land use.

Table 8. -- Planting Estimates For Level 2 (1978 Dollars)
(For Typical NGP Rangeland Site)

Technique	Cropland	Natural Vegetation	Wildlife	Recreation	High Use
Chisel plow	10.50	7.87	7.87	9.45	10.50
Disc and Harrow	3.75	2.81	2.81	3.37	3.75
Chaining	--	1.25	1.25	.50	--
Buy seed	4.00	50.00	50.00	44.00	40.00
Drill seed	3.75	2.81	2.81	3.37	3.75
Buy fertilizer: nitrogen	9.00	9.00	9.00	9.00	9.00
Buy fertilizer: phosphate	7.00	7.00	7.00	7.00	7.00
Drill fertilizer	1.00	.75	.75	.90	1.00
Buy hay mulch	37.50	28.12	28.12	33.75	37.50
Apply hay mulch	30.00	22.50	22.50	27.00	30.00
Hydromulch seed and fertilizer	--	100.00	100.00	40.00	--
Hand plant shrub and tree seedlings	--	150.00	150.00	150.00	--
Buy, apply herbicide	2.75	00	00	2.75	2.75
Administration tests, bonds, permits	16.39	57.32	57.32	49.66	21.79
TOTALS	125.64	439.43	439.43	380.75	167.04

The LEVEL 3 analysis requires user input of all items described in the CLAIM USER'S DATA BOOK (9), with the exception of the following:

1. Type of mine
2. Stage in mining sequence
3. General slope of ten random points in the area
4. Cost to excavate spoil
5. Distance between spoil bank peaks
6. Initial slope of the spoil bank
7. Area covered by the spoils
8. General slope of the area
9. Cost of grading overburden
10. Thickness of topsoil
11. Cost of topsoil removal
12. Cost for topsoil respreading.

All of the above items are defined or calculated prior to initialization of the LEVEL 3 analysis, with the possible exception of 4. This cost is computed only if the dragline subsystem is initiated prior to scheduling the reclamation subsystem. Otherwise, the user must input this value.

Upon completion of the environmental input, the user is presented with several CLAIM options (9). After exercising any or all of these options, he selects the post mine land use he desires; however, his selection may be restricted by the CLAIM system. The user may exit during any stage of input by entering a zero. When this happens, the system reverts to the LEVEL 2 analysis.

Revisions to ADM Routines

In order to pass required information to the CLAIM system, the following two common variables have been added to the routines ADM, ADMO, ADMUI, LRS, and MLRS:

CES (real): Cost to excavate spoil
MRLFG (integer): flag set to reclamation level.

The variable CES is initialized in subroutine MAIN, and set to the sum of the total ownership and operating cost of the dragline. MRFLG is initialized in the program LRS. In addition to the above two variables, a COMMON block has been declared in the MLRS program for communication with CLAIM routine (see Appendix C). This COMMON block is contained in the integer array CSSE. Regrade code has been transferred to the CLAIM executive RCLAM and deleted from MLRS. MLRS schedules RCLAM by:

1. Initializing CSSE entries

2. Using the appropriate EXEC calls to:
   a. allocate tracks for CSSE transfer
   b. write CSSE to the tracks
   c. swap control to RCLAM
   d. read CSSE from the tracks
   e. release the allocated tracks.

3. Redefine MLRS variables.

MLRS then checks MRFLG for scraper adjustments (MRFLG = 4), or an invalid dozer production curve (MRFLG = 5).

All code pertaining to land management and general dozing has been deleted. All other MLRS code has been left intact. Each code revision is clearly labeled in the program listing.

Program RCLAM

Program RCLAM is swapped by the LEVEL 2 reclamation program MLRS. The logic is summarized in Figure 20. The CSSE COMMON block is read from the disc, and converted to the appropriate units and variable names used by the CLAIM system. Depending on the value of MRFLGC, the following occurs:

MRFLGC = 2 (LEVEL 2 Reclamation Analysis).

The program calls IRSMR to read the recommended post mining topographical description for the land use reclamation alternatives, then calls DSPSP to allow user modification to the recommended description. OGPMR is called to calculate regrade volumes, then regrade parameters are calculated using MLRS code transfer. The dozer production curve is tested for validity. If invalid, the program sets MRFLGC to 5; otherwise, it calls LUOS for user selection of the post mine land use option. The appropriate CSSE COMMON elements are redefined, then written to the disc. Control is passed back to MLRS.

MRLFGC = 3 (LEVEL 3: Claim Subsystem Reclamation Analysis)

The program calls GETID to initialize CLAIM COMMON, then either inputs environmental data from a file, or allows manual input, according to user response. SRED is called for file entry; otherwise, IRSMR and DSPSP are called and regrade parameters computed and checked for validity as described above. EIFD or EIAD are scheduled, depending on user preference, to manually input environmental data. TFCD is called to test for complete data, for either file or manual input. The value of EXIT is checked: EXIT = -1 means complete data, and several CLAIM options are presented:

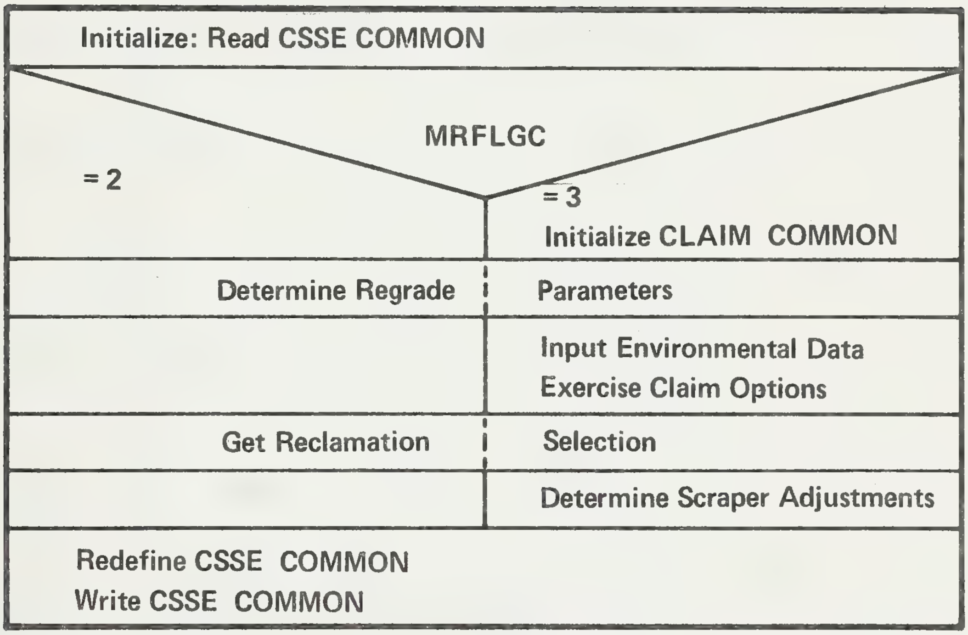


Figure 20.—RCLAM Logic

Option	Segments Scheduled
1. Select Reclamation Alternative	FEASI, TECON, OPUSE, LUOS
2. Edit environmental data	EIFD
3. Edit expectations	EIFD
4. Store data	SRED
5. List data	LED
6. List expectations	LEV
7. Analyze/output data	FEASI, TECON, OPUSE

After one is selected, the program tests for scraper adjustments by calling TCON1, TCON2, or TCON4. If needed, MRFLGC is set to 4, and HBTC is set to appropriate value.

For incomplete data, EXIT = -1, the program is directed by user response to:

Option	Segments Scheduled
1. Store data	SRED
2. Complete data	EIFD
3. Revert to LEVEL 2	Set MRFLGC to 2 and call LUDS

CSSE COMMON is redefined and written to the disc. Control is relinquished to MLRS.

Reference to CLAIM, Computerized Reclamation Planning System (9), is advised for a description of CLAIM COMMON and all routines scheduled by RCLAM.

Subroutine LUOS

Subroutine LUOS is scheduled by the program RCLAM, and uses the CLAIM COMMON block. The calling sequence is: CALL LUOS (CRV), where CRV is the planting costs for the LEVEL 2 reclamation analysis.

For LEVEL 2, LUOS reads planting costs from the file RVD: 15, and stores these in the array CRV. It then prints a table displaying grading costs and planting costs for the five land use options, and the user selects the land use reclamation alternative.

For LEVEL 3, LUOS calls EFC to determine the permitted land use options. Permitted alternatives are displayed and the user selects the land use option he desires.

Subroutine EFC

EFC is called by subroutine LUOS and uses the CLAIM COMMON block. The calling sequence is:

CALL EFC (LUORNS) where LUORNS is the land use option reference number array.

EFC first checks the environmental responses that require an alternative to be implemented. IARRY (4) is set to the land use option reference number of any mandatory technique, or zero when no alternatives are required. EFC then checks for alternatives that are not permitted, and sets LUORNS (I) to zero for any forbidden alternative. (I refers to the land use option reference number.)

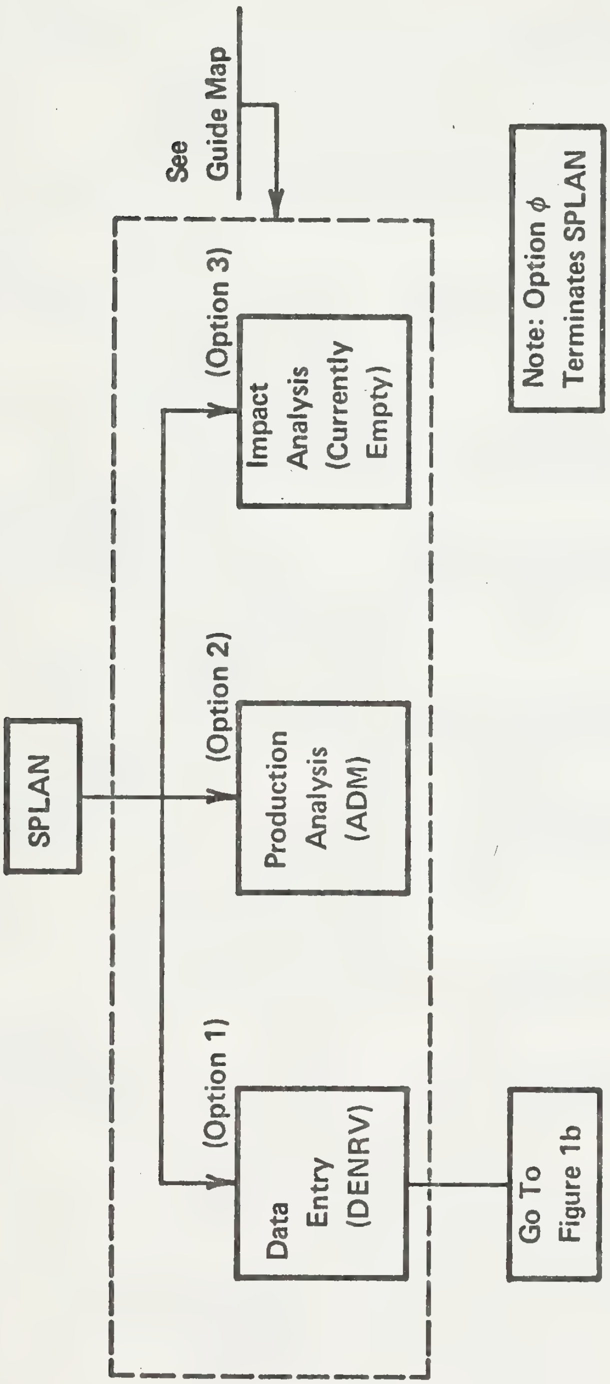


Figure 1a.—SEAMPLAN Modules

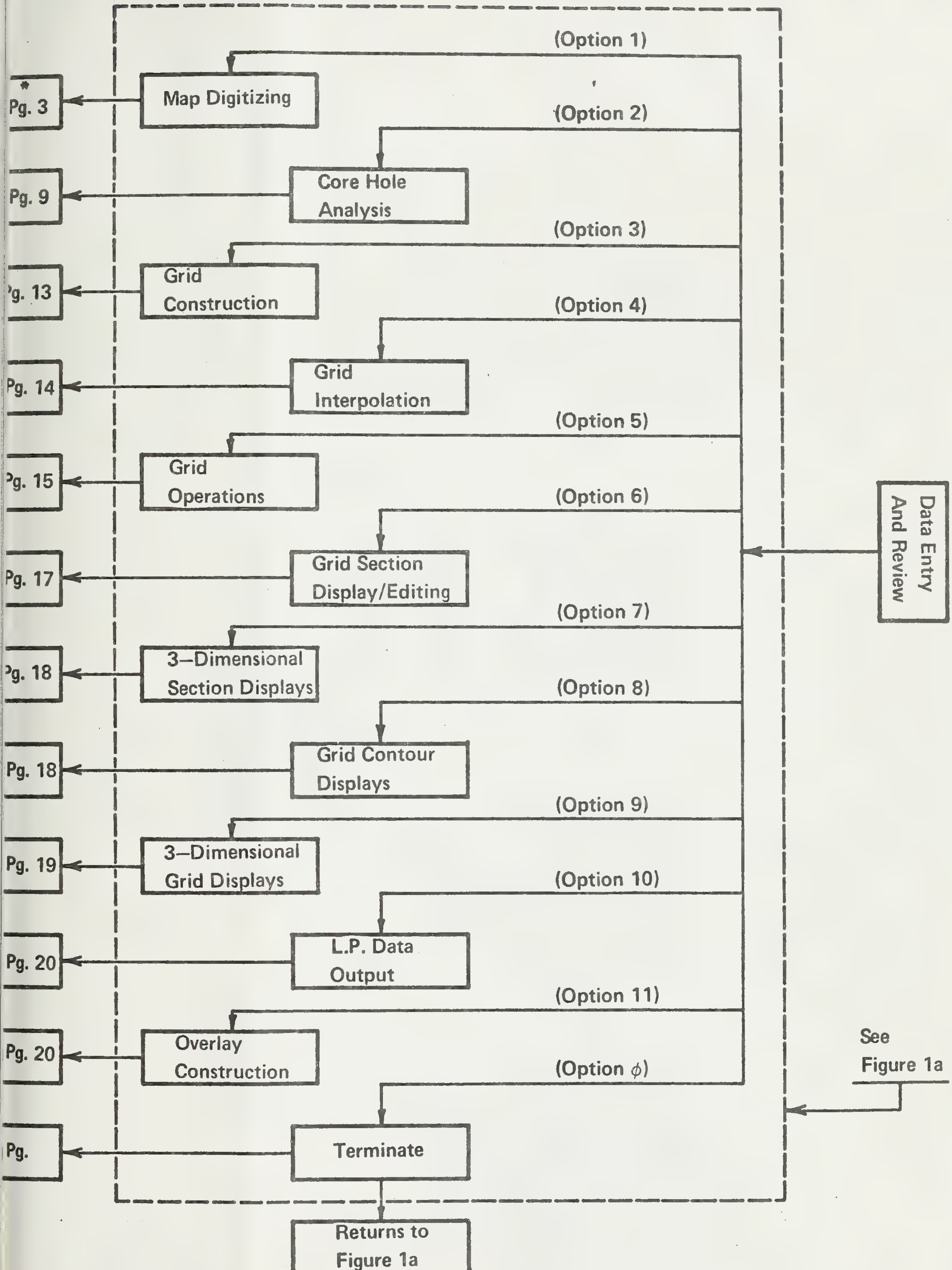


Figure 1b–SEAMPLAN Modules (continued)

*Refer to Vol. II for further info on these programs

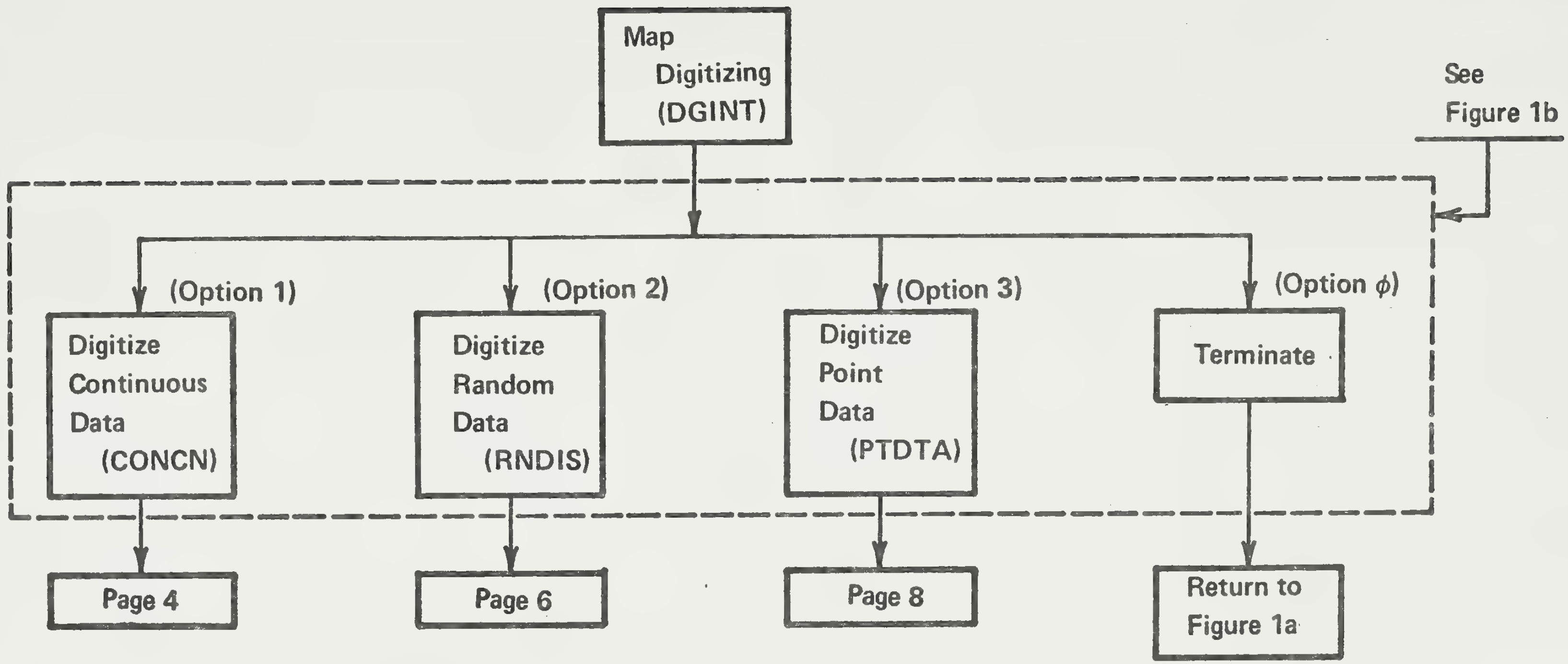


Figure 1c.—SEAMPLAN Modules

ME III

APPENDIX B

APPENDIX B TABLE OF CONTENTS

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL:

ROUTINE NAME: ADM — AUTHOR: Elm

REVISION CODE: — DATE: 6/9/79

LOCATION / ACCESS PROCEDURE: CR13; RV, ADMX (or Select 3 in SPLAN) file &ADM.

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Production Analysis executive subroutine called indicated by SPLAN through ADMX.

Also a Dummy swapping ADM subroutine is located in &ADMS file, CR13...

ACCESSED BY:
SPLAN (ADMX)

LINKAGES:

Linked by file to pit layout (external, forward)

Linked to EXEC1 through ADMX.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
CHSIZ (TCS) ERASE (ICS) IDSEC (SYS) SPOLU (SYS)

SPECIAL:
NMLST (System cartridge)

APPLICATION: (NAME/Program, Subroutine, OR Function)

ADMVT / S	CHS / S	CPF / S	DBE / S	DLS / S
GAA / S	LRS / S	QRE / S	RPT / S	RNITZ / S
GFINZ / S	DLINZ /			

DATA FILES ACCESSED:
FLCDC FLECRG FLRDFN

```
*******************************************************************************
*                                                                             *
* SEAMPLAN SOFTWARE DOCUMENTATION                  LEVEL:___________________  *
*                                                                             *
* ROUTINE NAME:__ADMUI__________                   AUTHOR:___Elm, MP, TEL____ *
*                                                                             *
* REVISION CODE:________________                   DATE:_____7/2/79________   *
*                                                                             *
* LOCATION / ACCESS PROCEDURE:___File &ADMUI,CR13/Production Analysis____     *
*                                                                             *
* TYPE:                                                                       *
*    [ ] PROGRAM        [X] SUBROUTINE        [ ] FUNCTION                    *
*                                                                             *
* GENERAL DESCRIPTION:                                                        *
*                                                                             *
*      This routine performs all user interaction with the macro production   *
*                                                                             *
*      analysis routine.                                                      *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* ACCESSED BY:                                                                *
*    ADM________  ___________  ___________  ___________  ___________          *
*                                                                             *
* LINKAGES:                                                                   *
*                                                                             *
*      Arguments - First, IDNFLG                                              *
*      Common Blocks - RTEK, GVNADM,GVNDEC, etc. . .                          *
*                                                                             *
* EXTERNAL REFERENCES:                                                        *
*                                                                             *
*    RTE, FILE MANAGER, LIBRARY:                                              *
*    BELL(TCS)    CLDFL(%DAFMP)  CHRZ(TCS)   DENFL(%DAFMP) DREAD(%DAFMP)      *
*    DWRIT(%DAFMP) ERASE(TCS)    HOME(TCS)   RDSEG(SYSLIB) TINPT(TCS)         *
*    ___________  ___________  ___________  ___________  ___________          *
*                                                                             *
*    SPECIAL:                                                                 *
*    SWAPF______  ___________  ___________  ___________  ___________          *
*    ___________  ___________  ___________  ___________  ___________          *
*                                                                             *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                    *
*    DLSZ____/S   SFLAG___/S   PTOPO___/S   MD______/S   ________/_           *
*    ________/_   ________/_   ________/_   ________/_   ________/_           *
*    ________/_   ________/_   ________/_   ________/_   ________/_           *
*    ________/_   ________/_   ________/_   ________/_   ________/_           *
*    ________/_   ________/_   ________/_   ________/_   ________/_           *
*                                                                             *
* DATA FILES ACCESSED:                                                        *
*    #MINE______  #PLTG1.....etc. or files Named in #MINE___  ___________     *
*    ___________  ___________  ___________  ___________  ___________          *
*                                                                             *
*******************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL:

ROUTINE NAME: ADMX AUTHOR: Elm

REVISION CODE: DATE: 6/9/79

LOCATION / ACCESS PROCEDURE: CR13. File &ADMX / Ru, ADMX or Ru, SPLAN
select 3 ...

TYPE:
[x] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Production analysis program for swapping ADM. subroutine.

ACCESSED BY:
SPLAN

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
CLRFO (RTE) EXEC (RTE) IDSEG (SYS lib) INITT (PLOTT 0)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
ADM / S BDATA / S

DATA FILES ACCESSED:

```
*****************************************************************************
*                                                                           *
* SEAMPLAN SOFTWARE DOCUMENTATION                  LEVEL:____3__________    *
*                                                                           *
* ROUTINE NAME:__AHAT__________                    AUTHOR:___Elm__________  *
*                                                                           *
* REVISION CODE:_______________                    DATE:_____8/16/79______  *
*                                                                           *
* LOCATION / ACCESS PROCEDURE:_______&AHAT_________________________________ *
*                                                                           *
* TYPE:                                                                     *
*    [ ] PROGRAM       [X] SUBROUTINE       [ ] FUNCTION                    *
*                                                                           *
* GENERAL DESCRIPTION:                                                      *
*                                                                           *
*      Computer WPRIM parameter for spoil area calculation in 2-pass        *
*  dragline model.                                                          *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
* ACCESSED BY:                                                              *
*    __MOD2____   __________   __________   __________   __________         *
*                                                                           *
* LINKAGES:                                                                 *
*                                                                           *
*      COMMON - IFCOM, M1COM, M2COM, T2COM blocks                           *
*      Arguments - AREA, WC, AHATT,WPRIM                                    *
*                                                                           *
* EXTERNAL REFERENCES:                                                      *
*                                                                           *
*    RTE, FILE MANAGER, LIBRARY:                                            *
*    __________   __________   __________   __________   __________         *
*    __________   __________   __________   __________   __________         *
*    __________   __________   __________   __________   __________         *
*                                                                           *
*    SPECIAL:                                                               *
*    __________   __________   __________   __________   __________         *
*    __________   __________   __________   __________   __________         *
*                                                                           *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                  *
*    ________/_   ________/_   ________/_   ________/_   ________/_         *
*    ________/_   ________/_   ________/_   ________/_   ________/_         *
*    ________/_   ________/_   ________/_   ________/_   ________/_         *
*    ________/_   ________/_   ________/_   ________/_   ________/_         *
*    ________/_   ________/_   ________/_   ________/_   ________/_         *
*                                                                           *
* DATA FILES ACCESSED:                                                      *
*    __________   __________   __________   __________   __________         *
*    __________   __________   __________   __________   __________         *
*                                                                           *
*****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION   LEVEL: 3

ROUTINE NAME: ANALY   AUTHOR: Elm

REVISION CODE: DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &ANALY file / RU, SPLAN

TYPE:
[ ] PROGRAM   [X] SUBROUTINE   [ ] FUNCTION

GENERAL DESCRIPTION:

ANALY is called when the dragline design optimization is called. It interacts ith the user and combines this input with model and site parameters to construct constraint and decision variable sets for the flexible

ACCESSED BY:
PITON

LINKAGES: COMMON - Tektronix; 1 and 2 pass model blocks Arguements - IMOD, NX, NIC, NC, Model selection paly and NLP parameters.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
CHSIZ(TCS)   ERASE(TCS)   HOME(TCS)   TINPT(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
CNSTR / S   PIAGR / S   FLEX / S

DATA FILES ACCESSED:

```
**********************************************************************
*                                                                    *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:___4____________ *
*                                                                    *
* ROUTINE NAME:___AOBR_______                  AUTHOR:___ELM_________ *
*                                                                    *
* REVISION CODE:_____________                  DATE:____8-25-79______ *
*                                                                    *
* LOCATION / ACCESS PROCEDURE:____& AOBR_______________________________ *
*                                                                    *
* TYPE:                                                              *
*    [ ] PROGRAM       [X] SUBROUTINE       [ ] FUNCTION             *
*                                                                    *
* GENERAL DESCRIPTION:                                               *
*                                                                    *
*       Displays and/or prints totals and averages for each stripping *
*       operations.  At the end of a dragline simulation, it also displays *
*       totals and averages for the run                              *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
* ACCESSED BY:                                                       *
*    __OBRF____   __BNRF____   __BFLF____   __DTOT____   __DUMP____  *
*                                                                    *
* LINKAGES:                                                          *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
* EXTERNAL REFERENCES:                                               *
*                                                                    *
*    RTE, FILE MANAGER, LIBRARY:                                     *
*    ERASE (TCS)   __________   __________   __________   __________ *
*    __________   __________   __________   __________   __________  *
*    __________   __________   __________   __________   __________  *
*                                                                    *
*    SPECIAL:                                                        *
*    __________   __________   __________   __________   __________  *
*    __________   __________   __________   __________   __________  *
*                                                                    *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)           *
*    ________/_   ________/_   ________/_   ________/_   ________/_  *
*    ________/_   ________/_   ________/_   ________/_   ________/_  *
*    ________/_   ________/_   ________/_   ________/_   ________/_  *
*    ________/_   ________/_   ________/_   ________/_   ________/_  *
*    ________/_   ________/_   ________/_   ________/_   ________/_  *
*                                                                    *
* DATA FILES ACCESSED:                                               *
*    LU5, LU6___   approximates vary______   __________   __________ *
*    __________   __________   __________   __________   __________  *
*                                                                    *
**********************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION   LEVEL: 4

ROUTINE NAME: BCORD   AUTHOR: Elm

REVISION CODE: ____   DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & BCORD

TYPE:

[ ] PROGRAM   [X] SUBROUTINE   [ ] FUNCTION

GENERAL DESCRIPTION:

Generates a possible bucket path from the current position to the end specified in the arguments. (5-5)

ACCESSED BY:

MUSG   OBR   SWGA

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

NH / F   RTHTA / F

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL:

ROUTINE NAME: BDATA AUTHOR: Elm

REVISION CODE: DATE: 7/16/79

LOCATION / ACCESS PROCEDURE: File &BDATA /involved by ADMX

TYPE:

[ ] PROGRAM [x] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

BDATA simulates a block data routine to initialize ADM Common areas.

ACCESSED BY:

ADMX

LINKAGES:

Blank Common Blocks

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

BDGAA /S

DATA FILES ACCESSED:

```
***********************************************************************
*                                                                     *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:                 *
*                                                                     *
* ROUTINE NAME:BDGAA                           AUTHOR: Elm            *
*                                                                     *
* REVISION CODE:                               DATE: 7/16/79          *
*                                                                     *
* LOCATION / ACCESS PROCEDURE: File &BDGAA / RV,ADMX                  *
*                                                                     *
* TYPE:                                                               *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                *
*                                                                     *
* GENERAL DESCRIPTION:                                                *
*                                                                     *
*      Simulates a BLOCKDATA initialization of the GAA Common Area.   *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
* ACCESSED BY:                                                        *
*      BDATA                                                          *
*                                                                     *
* LINKAGES:                                                           *
*                                                                     *
*      GAA Common Area required.                                      *
*                                                                     *
*                                                                     *
* EXTERNAL REFERENCES:                                                *
*                                                                     *
*    RTE, FILE MANAGER, LIBRARY:                                      *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
*    SPECIAL:                                                         *
*                                                                     *
*                                                                     *
*                                                                     *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)            *
*          /           /           /           /           /          *
*          /           /           /           /           /          *
*          /           /           /           /           /          *
*          /           /           /           /           /          *
*          /           /           /           /           /          *
*                                                                     *
* DATA FILES ACCESSED:                                                *
*                                                                     *
*                                                                     *
*                                                                     *
***********************************************************************
```

```
*************************************************************************
*                                                                       *
* SEAMPLAN SOFTWARE DOCUMENTATION               LEVEL:___4____________  *
*                                                                       *
* ROUTINE NAME:_BFILL_________                  AUTHOR:__Elm__________  *
*                                                                       *
* REVISION CODE:______________                  DATE:____8-25-79______  *
*                                                                       *
* LOCATION / ACCESS PROCEDURE:_& BFILL__________________________________  *
*                                                                       *
* TYPE:                                                                 *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                  *
*                                                                       *
* GENERAL DESCRIPTION:                                                  *
*                                                                       *
*       Calculates dumping location for bevels fill operations and updates *
*       the overburden array for proper distribution of the material.   *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
* ACCESSED BY:                                                          *
*    __OBR_____  __________  __________  __________  __________         *
*                                                                       *
* LINKAGES:                                                             *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
* EXTERNAL REFERENCES:                                                  *
*                                                                       *
*    RTE, FILE MANAGER, LIBRARY:                                        *
*    __________  __________  __________  __________  __________         *
*    __________  __________  __________  __________  __________         *
*    __________  __________  __________  __________  __________         *
*                                                                       *
*    SPECIAL:                                                           *
*    __________  __________  __________  __________  __________         *
*    __________  __________  __________  __________  __________         *
*                                                                       *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)              *
*    _____NH_/F  ___RTHTA/F  ___SPRED/S  ________/_  ________/_         *
*    ________/_  ________/_  ________/_  ________/_  ________/_         *
*    ________/_  ________/_  ________/_  ________/_  ________/_         *
*    ________/_  ________/_  ________/_  ________/_  ________/_         *
*    ________/_  ________/_  ________/_  ________/_  ________/_         *
*                                                                       *
* DATA FILES ACCESSED:                                                  *
*    __________  __________  __________  __________  __________         *
*    __________  __________  __________  __________  __________         *
*                                                                       *
*************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: BFL AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & BFL

TYPE:

[ ] PROGRAM [x] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

BFL controls the bend fill operation sequencing.

ACCESSED BY:

DRAG

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

BFLE /S OBR / S

DATA FILES ACCESSED:

```
*************************************************************************
*                                                                       *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL: 4                 *
*                                                                       *
* ROUTINE NAME: BFLF                           AUTHOR: Elm              *
*                                                                       *
* REVISION CODE: ____________                  DATE: 8-25-79            *
*                                                                       *
* LOCATION / ACCESS PROCEDURE: & BFLF                                   *
*                                                                       *
* TYPE:                                                                 *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                  *
*                                                                       *
* GENERAL DESCRIPTION:                                                  *
*                                                                       *
*      Writes bench fill operations totals on the line printer and/or   *
*      CRT when appropriate during a dragline simulation.               *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
* ACCESSED BY:                                                          *
*    BEL                                                                *
*                                                                       *
* LINKAGES:                                                             *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
* EXTERNAL REFERENCES:                                                  *
*                                                                       *
*    RTE, FILE MANAGER, LIBRARY:                                        *
*    ~~ERASE (TGS)~~   IDENT(SYS)                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*    SPECIAL:                                                           *
*                                                                       *
*                                                                       *
*                                                                       *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)              *
*    AOBR/ S        __/         __/         __/         __/             *
*    __/            __/         __/         __/         __/             *
*    __/            __/         __/         __/         __/             *
*    __/            __/         __/         __/         __/             *
*    __/            __/         __/         __/         __/             *
*                                                                       *
* DATA FILES ACCESSED:                                                  *
*    LU5, LU6      assignment varies                                    *
*                                                                       *
*                                                                       *
*************************************************************************
```

```
*******************************************************************************
*                                                                             *
* SEAMPLAN SOFTWARE DOCUMENTATION                 LEVEL:____________________ *
*                                                                             *
* ROUTINE NAME:___BF2__________                   AUTHOR:_W._Larson_________ *
*                                                                             *
* REVISION CODE:_______________                   DATE:_____________________ *
*                                                                             *
* LOCATION / ACCESS PROCEDURE:_CORE_HOLE_CONSTRUCTION_AND_VERTIFICATION_____ *
*                                                                             *
* TYPE:                                                                       *
*    [X] PROGRAM        [ ] SUBROUTINE        [ ] FUNCTION                    *
*                                                                             *
* GENERAL DESCRIPTION:                                                        *
*                                                                             *
*     This is a test program.  It is used to verify the keyed access files   *
*     built for core hole analysis.                                          *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* ACCESSED BY:                                                                *
*    __________   __________   __________   __________   __________          *
*                                                                             *
* LINKAGES:                                                                   *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* EXTERNAL REFERENCES:                                                        *
*                                                                             *
*    RTE, FILE MANAGER, LIBRARY:                                              *
*    CHSIZ(TCS)__   _CLOSK(%KAFMP) _EXEC_(RTE)_   _INITT_(TCS)   __________  *
*    OPENK(%KAFMP)  _RETRV(%KAFMP) __________   __________   __________      *
*    __________   __________   __________   __________   __________          *
*                                                                             *
*    SPECIAL:                                                                 *
*    __________   __________   __________   __________   __________          *
*    __________   __________   __________   __________   __________          *
*                                                                             *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                    *
*    ________/_   ________/_   ________/_   ________/_   ________/_          *
*    ________/_   ________/_   ________/_   ________/_   ________/_          *
*    ________/_   ________/_   ________/_   ________/_   ________/_          *
*    ________/_   ________/_   ________/_   ________/_   ________/_          *
*    ________/_   ________/_   ________/_   ________/_   ________/_          *
*                                                                             *
* DATA FILES ACCESSED:                                                        *
*    __________   __________   __________   __________   __________          *
*    __________   __________   __________   __________   __________          *
*                                                                             *
*******************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: BHEEL — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & BHEEL

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Calculates the bucket path coordinates and distributes the material moved by heeling during bench fill operations in the dragline simulator.

ACCESSED BY:

OBR

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

NH /F	PUTNH /S	RTHTA/F	SPRED /S	/

DATA FILES ACCESSED:

```
***********************************************************************
*                                                                     *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL: 4               *
*                                                                     *
* ROUTINE NAME: BNR                            AUTHOR: Elm            *
*                                                                     *
* REVISION CODE: ____________                  DATE: 8-25-79          *
*                                                                     *
* LOCATION / ACCESS PROCEDURE: & BNR                                  *
*                                                                     *
* TYPE:                                                               *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                *
*                                                                     *
* GENERAL DESCRIPTION:                                                *
*      Controls sequencing during bench removal operations in a       *
*      dragline simulation.                                           *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
* ACCESSED BY:                                                        *
*    DRAG                                                             *
*                                                                     *
* LINKAGES:                                                           *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
* EXTERNAL REFERENCES:                                                *
*                                                                     *
*    RTE, FILE MANAGER, LIBRARY:                                      *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
*    SPECIAL:                                                         *
*                                                                     *
*                                                                     *
*                                                                     *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)            *
*    BNRF/S    OBR/S    ____/_    ____/_    ____/_                    *
*    ____/_    ____/_   ____/_    ____/_    ____/_                    *
*    ____/_    ____/_   ____/_    ____/_    ____/_                    *
*    ____/_    ____/_   ____/_    ____/_    ____/_                    *
*    ____/_    ____/_   ____/_    ____/_    ____/_                    *
*                                                                     *
* DATA FILES ACCESSED:                                                *
*                                                                     *
*                                                                     *
*                                                                     *
***********************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: BNRF AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & BNRF

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Writes bench removal operation totals on the line printer and/or the CRT when the cycles are normally controlled in the dragline simulation.

ACCESSED BY:

BNR

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ERASE (TCS) IDENT (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

AOBR /S

DATA FILES ACCESSED:

LU5, LU6 assignments vary

```
****************************************************************************
*                                                                          *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL: 3                    *
*                                                                          *
* ROUTINE NAME: BOOM                           AUTHOR: Elm                 *
*                                                                          *
* REVISION CODE:                               DATE: 7/30/79               *
*                                                                          *
* LOCATION / ACCESS PROCEDURE: &BOOM                                       *
*                                                                          *
* TYPE:                                                                    *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                     *
*                                                                          *
* GENERAL DESCRIPTION:                                                     *
*                                                                          *
*       BOOM draws the dragline boom in either the plan or cross-section views *
*                                                                          *
*       of the casting diagram.                                            *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
* ACCESSED BY:                                                             *
*     DRAGL                                                                *
*                                                                          *
* LINKAGES:                                                                *
*                                                                          *
*       COMMON - Tektronix, MOD1, MOD2, DIAGR blocks                       *
*                                                                          *
*       Arguments - X OFF, Y OFF, Z VIEW, DELTA; point location arrays, view *
* EXTERNAL REFERENCES:                                                     *
*       play, and boom rotation angle.                                     *
*    RTE, FILE MANAGER, LIBRARY:                                           *
*    DRAWA(TCS)    IOWAT(TCS)    MOVEA(TCS)                                *
*                                                                          *
*                                                                          *
*                                                                          *
*    SPECIAL:                                                              *
*                                                                          *
*                                                                          *
*                                                                          *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                 *
*    /          /          /          /          /                         *
*    /          /          /          /          /                         *
*    /          /          /          /          /                         *
*    /          /          /          /          /                         *
*    /          /          /          /          /                         *
*                                                                          *
* DATA FILES ACCESSED:                                                     *
*                                                                          *
*                                                                          *
*                                                                          *
****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL:

ROUTINE NAME: BOX AUTHOR: Lehman

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: & CNTRG file

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Draws a frame around the rectangle whose minimum and maximum coordinates are arguments of the routine.

ACCESSED BY:

CNTRG PLTCN

LINKAGES:

Called by PLTCN; no common; uses arguments.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

TCS

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: BPWR — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & BFWR

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Computes the power used to load the bucket and smooth the terrain during bench fill operations (5-26).

ACCESSED BY:
DIG OBR

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
RTHTA/S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 2

ROUTINE NAME: BTDL AUTHOR: Elm

REVISION CODE: DATE: 7/20/79

LOCATION / ACCESS PROCEDURE: &BTDL file / RV,ADM; RV, SPLAN

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Called by DLS to size a dragline (if RDNFLG = 0, or the macro model is regetted) and estimated owning and opertaing costs for the machine.

ACCESSED BY:

DLS

LINKAGES:

GVNADM Common Area; GVNDEC Common Area; Arguments: RRMA, DRF, IDNFLG

IDNFLG - 'MSU' Design Play (1 ⇒ level 2 dragline design, 0 ⇒ level 1 (ADM Macro)

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

FOLQ / S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: BUCKT AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & BUCKT

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Originally named BUCKET. Together with DIG determines where the bucket is to be loaded each cycle. BUCKT determines if a load can be obtained for each path. (Pg. 5-29)

ACCESSED BY:
DIG

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
NH /F PUTNH /S

DATA FILES ACCESSED:

```
***********************************************************************
*                                                                     *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:________________ *
*                                                                     *
* ROUTINE NAME:__BUILD________                 AUTHOR:_W. Larson_____ *
*                                                                     *
* REVISION CODE:______________                 DATE:____5/79_________ *
*                                                                     *
* LOCATION / ACCESS PROCEDURE:___CORE HOLE CONSTRUCTION AND VERIFICATION *
*                                                                     *
* TYPE:                                                               *
*    [X ] PROGRAM       [ ] SUBROUTINE       [ ] FUNCTION             *
*                                                                     *
* GENERAL DESCRIPTION:                                                *
*                                                                     *
*    CONVERTS Type 3 files to Type 2 files for core hole analysis.    *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
* ACCESSED BY:                                                        *
*    __________  __________  __________  __________  __________       *
*                                                                     *
* LINKAGES:                                                           *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
* EXTERNAL REFERENCES:                                                *
*                                                                     *
*    RTE, FILE MANAGER, LIBRARY:                                      *
*    CLOSE (RTE)  CREAT (RTE)  EXEC(RTE)   OPEN(RTE)   READF(RTE)     *
*    WRITE(RTE)   __________  __________  __________  __________      *
*    __________  __________  __________  __________  __________       *
*                                                                     *
*    SPECIAL:                                                         *
*    __________  __________  __________  __________  __________       *
*    __________  __________  __________  __________  __________       *
*                                                                     *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)            *
*    BLANK____/_S  ________/_  ________/_  ________/_  ________/_     *
*    ________/_    ________/_  ________/_  ________/_  ________/_     *
*    ________/_    ________/_  ________/_  ________/_  ________/_     *
*    ________/_    ________/_  ________/_  ________/_  ________/_     *
*    ________/_    ________/_  ________/_  ________/_  ________/_     *
*                                                                     *
* DATA FILES ACCESSED:                                                *
*    __________  __________  __________  __________  __________       *
*    __________  __________  __________  __________  __________       *
*                                                                     *
***********************************************************************
```

```
*************************************************************************
*                                                                       *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:                   *
*                                                                       *
* ROUTINE NAME: CFINZ                          AUTHOR: Elm              *
*                                                                       *
* REVISION CODE:                               DATE:                    *
*                                                                       *
* LOCATION / ACCESS PROCEDURE: &CFINZ /                                 *
*                                                                       *
* TYPE:                                                                 *
*     [ ] PROGRAM        [x] SUBROUTINE        [ ] FUNCTION             *
*                                                                       *
* GENERAL DESCRIPTION:                                                  *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
* ACCESSED BY:                                                          *
*     ADM(ADM1)                                                         *
*                                                                       *
* LINKAGES:                                                             *
*                                                                       *
*     SVNCFA Common block.                                              *
*                                                                       *
*                                                                       *
* EXTERNAL REFERENCES:                                                  *
*                                                                       *
*     RTE, FILE MANAGER, LIBRARY:                                       *
*     COOE(Sys)     SPOLU(lib)                                          *
*                                                                       *
*                                                                       *
*                                                                       *
*     SPECIAL:                                                          *
*                                                                       *
*                                                                       *
*                                                                       *
*     APPLICATION:  (NAME/Program, Subroutine, OR Function)             *
*          /            /            /            /            /        *
*          /            /            /            /            /        *
*          /            /            /            /            /        *
*          /            /            /            /            /        *
*          /            /            /            /            /        *
*                                                                       *
* DATA FILES ACCESSED:                                                  *
*     #VNCFA                                                            *
*                                                                       *
*                                                                       *
*************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 2

ROUTINE NAME: CHS AUTHOR: Elm

REVISION CODE: DATE: 7/19/79

LOCATION / ACCESS PROCEDURE: &CHS /(RU, ADM;RV, SPLAN)

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

The CHS routine evaluates the FLOUR UTAH ADM Coal Local and Hand Macro Model.

ACCESSED BY:

ADM

LINKAGES:

CHS Common Block (Blank)

Arguments: LFEC, LFLP - Logical Units LOGCH,LOGEC - Model option selection plays.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

CODE(RTE)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

FLECRG

```
*****************************************************************************
*                                                                           *
* SEAMPLAN SOFTWARE DOCUMENTATION                  LEVEL: 3                 *
*                                                                           *
* ROUTINE NAME: CMP7                               AUTHOR: Elm              *
*                                                                           *
* REVISION CODE:                                   DATE: 8/9/79             *
*                                                                           *
* LOCATION / ACCESS PROCEDURE: &CMP7                                        *
*                                                                           *
* TYPE:                                                                     *
*    [ ] PROGRAM      [X ] SUBROUTINE      [ ] FUNCTION                     *
*                                                                           *
* GENERAL DESCRIPTION:                                                      *
*                                                                           *
*       CMP7 uses dragline stripping design geometry parameters to compute  *
*  reference points for casting diagram construction and load them in PTARR *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
* ACCESSED BY:                                                              *
*    DIAGR                                                                  *
*                                                                           *
* LINKAGES:                                                                 *
*       COMMON - Tektronix, M1COM, M2COM, and DIAGR Blocks.                 *
*                                                                           *
*                                                                           *
*                                                                           *
* EXTERNAL REFERENCES:                                                      *
*                                                                           *
*    RTE, FILE MANAGER, LIBRARY:                                            *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*    SPECIAL:                                                               *
*                                                                           *
*                                                                           *
*                                                                           *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                  *
*           /            /            /            /            /           *
*           /            /            /            /            /           *
*           /            /            /            /            /           *
*           /            /            /            /            /           *
*           /            /            /            /            /           *
*                                                                           *
* DATA FILES ACCESSED:                                                      *
*                                                                           *
*                                                                           *
*                                                                           *
*****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: CNSTR — AUTHOR: Elm

REVISION CODE: — DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &CNSTR

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION: CNSTR is called after the selected model has been evaluated to translate infeasibilities detected into response codes. RSPON is called to communiate the feasibility states to the user.

ACCESSED BY:
PITON ANALY

LINKAGES: COMMON - Tektronix, MOD1, MOD2 blocks,

Arguments - NIC, the number of inequality contraints.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
ERASE(TCS) HOME(TCS) TINPT(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
RSPON/S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL:

ROUTINE NAME: CNTRG

AUTHOR: Lehman

REVISION CODE: 1.0

DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &CNTRG file

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Initializes parameters and draws frame for contour plots; calls grid contouring subroutine.

ACCESSED BY:
TOPO PTOPO

LINKAGES:

Swapped by TOPO and PTOPO; retrieves common from disc.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
EXEC RMPAR

SPECIAL:
TCS DSP

APPLICATION: (NAME/Program, Subroutine, OR Function)
PLTCN/S OUTLN/S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: CNTUR — AUTHOR: M. Paxton

REVISION CODE: — DATE: 8/3/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This routine is used to draw the files created by CONCN. These are continuous data files.

ACCESSED BY:

CONDR

LINKAGES:

ITEK, COMMON BLOCK from Program CONDR

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD (TCS) HOME (TCS) PCLPT (SYS)
CHSIZ (TCS) MOVEA (TCS)
DASHA (TCS) MOVRL (TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

MAPIO /S

DATA FILES ACCESSED:

```
***************************************************************************
*                                                                         *
* SEAMPLAN SOFTWARE DOCUMENTATION                  LEVEL:________________ *
*                                                                         *
* ROUTINE NAME: CODER                              AUTHOR: Conners        *
*                                                                         *
* REVISION CODE: 1.0                               DATE: 6/1/79           *
*                                                                         *
* LOCATION / ACCESS PROCEDURE: &CODER                                     *
*                                                                         *
* TYPE:                                                                   *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                    *
*                                                                         *
* GENERAL DESCRIPTION:                                                    *
*                                                                         *
*      Performs real to integer and integer to real transformations on    *
*                                                                         *
*      grid data.                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
* ACCESSED BY:                                                            *
*      CSEDT        CSEDO        CSEOT                                    *
*                                                                         *
* LINKAGES:                                                               *
*                                                                         *
*      Two arguments are passed.                                          *
*                                                                         *
*                                                                         *
* EXTERNAL REFERENCES:                                                    *
*                                                                         *
*    RTE, FILE MANAGER, LIBRARY:                                          *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
*    SPECIAL:                                                             *
*                                                                         *
*                                                                         *
*                                                                         *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                *
*         /            /            /            /            /           *
*         /            /            /            /            /           *
*         /            /            /            /            /           *
*         /            /            /            /            /           *
*         /            /            /            /            /           *
*                                                                         *
* DATA FILES ACCESSED:                                                    *
*                                                                         *
*                                                                         *
*                                                                         *
***************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION   LEVEL: 4

ROUTINE NAME: CONCN   AUTHOR: M. Wagner

REVISION CODE: DATE: 8/2/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:

[X] PROGRAM   [ ] SUBROUTINE   [ ] FUNCTION

GENERAL DESCRIPTION:

This Program is designed to input continuous DATA from the digitizing tablet.

ACCESSED BY:

DGINT

LINKAGES:

IPRM

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD (TCS)	CLOSE (RTE)	EXEC (RTE)	IDSEC (SYS)	MOVAB (TCS)
BELL (TCS)	ONEPT (%TABLT)	CHSIZ (TCS)	ERASE (TCS)	HOME (TCS)
INITT (TCS)	OPEN (RTE)	POSNT (RTE)	TBINT (%TABLT)	PURGE (RTE)
WRITF (RTE)	READF (RTE)			

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

CONDR / P
UPDAT / S
SCALE / S
SQUAR / S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: CONDR AUTHOR: M. Wagner

REVISION CODE: DATE: 8/2/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This Program Draws the continuous data from the files built by CONCN

ACCESSED BY:
CONCN

LINKAGES:
IPRM, ITEK, COMMON BLOC FROM CONCN.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD (TCS)	CHSIZ (TCS)	DRAWA (TCS)	DSHAB (TCS)	FLOAT (TCS)
BELL (TCS)	CLOSE (RTE)	DRWAB (TCS)	ERASE (TCS)	HDCRV (TCS)
BMLOC (SYS)	DASHA (TCS)	DRWRL (TCS)	EXEC (RTE)	HOME (TCS)
INITT (TCS)	MOVRL (TCS)	TINPT (SYS)	MOVAB (TCS)	RMPAR (SYS)
	VCRSR (TCS)	MOVEA (TCS)	SWNDO (TCS)	VWNDO (TCS)

APPLICATION: (NAME/Program, Subroutine, OR Function)

CNTUR / S
MAPIO / S

DATA FILES ACCESSED:

```
*************************************************************************
*                                                                       *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:___2____________   *
*                                                                       *
* ROUTINE NAME:__CORE_________                 AUTHOR:__Elm__________   *
*                                                                       *
* REVISION CODE:______________                 DATE:____8/23/79______   *
*                                                                       *
* LOCATION / ACCESS PROCEDURE:_______________________________________   *
*                                                                       *
* TYPE:                                                                 *
*    [X] PROGRAM       [ ] SUBROUTINE       [ ] FUNCTION                *
*                                                                       *
* GENERAL DESCRIPTION:                                                  *
*                                                                       *
*       CORE is the core hole data analysis executive program.  As such, it *
*  interacts with the user and calls correlation or cross-section analysis *
*  routines depending on his choice.                                    *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
* ACCESSED BY:                                                          *
*    ___DENRU___   ___________   ___________   ___________   ________   *
*                                                                       *
* LINKAGES:                                                             *
*                                                                       *
*       None                                                            *
*                                                                       *
*                                                                       *
* EXTERNAL REFERENCES:                                                  *
*                                                                       *
*    RTE, FILE MANAGER, LIBRARY:                                        *
*    ___CHSIZ (TCS)  _EXEC (RTE)   _INITT (TCS)   _NEWPG (TCS)   ______ *
*    ___________   ___________   ___________   ___________   ________   *
*    ___________   ___________   ___________   ___________   ________   *
*                                                                       *
*    SPECIAL:                                                           *
*    ___SWAP____   ___________   ___________   ___________   ________   *
*    ___________   ___________   ___________   ___________   ________   *
*                                                                       *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)              *
*    _________/_   _________/_   _________/_   _________/_   _______/_  *
*    _________/_   _________/_   _________/_   _________/_   _______/_  *
*    _________/_   _________/_   _________/_   _________/_   _______/_  *
*    _________/_   _________/_   _________/_   _________/_   _______/_  *
*    _________/_   _________/_   _________/_   _________/_   _______/_  *
*                                                                       *
* DATA FILES ACCESSED:                                                  *
*    ___________   ___________   ___________   ___________   ________   *
*    ___________   ___________   ___________   ___________   ________   *
*                                                                       *
*************************************************************************
```

```
***************************************************************************
*                                                                         *
* SEAMPLAN SOFTWARE DOCUMENTATION                 LEVEL: 3                *
*                                                                         *
* ROUTINE NAME: COREL                             AUTHOR:                 *
*                                                                         *
* REVISION CODE:                                  DATE: 5/79              *
*                                                                         *
* LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW                      *
*                                                                         *
* TYPE:                                                                   *
*    [X] PROGRAM       [ ] SUBROUTINE       [ ] FUNCTION                  *
*                                                                         *
* GENERAL DESCRIPTION:                                                    *
*                                                                         *
*         Correlate test hole parameter beds by using graphs plotted      *
*                                                                         *
*     from concentration values.                                          *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
* ACCESSED BY:  Run COREL                                                 *
*                                                                         *
*                                                                         *
* LINKAGES:                                                               *
*                                                                         *
*                                                                         *
*     ITEK, COMMON BLOCK                                                  *
*                                                                         *
* EXTERNAL REFERENCES:                                                    *
*                                                                         *
*    RTE, FILE MANAGER, LIBRARY:                                          *
*    BLANK(%KAFMP)   EXEC(RTE)    INITT(TCS)                              *
*    CHSIZ(TCS)      HOME(TCS)    OPENK(%KAFMP)                           *
*    CLOSK(%KAFMP)   IDSEG(SYS)                                           *
*                                                                         *
*    SPECIAL:                                                             *
*                                                                         *
*                                                                         *
*                                                                         *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                *
*    RTRVL /P                                                             *
*    GRFF  /P                                                             *
*                                                                         *
* DATA FILES ACCESSED:                                                    *
*                                                                         *
***************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 2

ROUTINE NAME: CPF AUTHOR: Elm

REVISION CODE: DATE: 7/19/79

LOCATION / ACCESS PROCEDURE: &CPF

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

FLUOR UTAH ADM Coal preparation plant model evaluation and output routine.

ACCESSED BY:
ADM

LINKAGES:

CPF Common Block Arguments: LFEC, LFLP -- Logical Units

LOBSD, LOGEC - Model selection flags.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
CODE(RTE)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:
FLECRG

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: ______

ROUTINE NAME: CRAMR AUTHOR: Lehman

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &PTLOT :: 17

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Solves a pair of simultaneous linear equations useing Cramer's rule.

ACCESSED BY:
PTLOT

LINKAGES:

Arguments include coefficients of the lines, returns coordinates

of interesting point.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL:

ROUTINE NAME: CROSS

AUTHOR: Lehman

REVISION CODE: 1.0

DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &PTLOT :: 17

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Draws a 4 roster unit cross at user specified location.

ACCESSED BY:

PTLOT

LINKAGES:

Arguments include the virtual coordinates of the location of the cross.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

TCS

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
****************************************************************************
*                                                                          *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:                      *
*                                                                          *
* ROUTINE NAME: CSDRW                          AUTHOR: Conners             *
*                                                                          *
* REVISION CODE: 1.0                           DATE: 6/1/79                *
*                                                                          *
* LOCATION / ACCESS PROCEDURE: &CSDRW                                      *
*                                                                          *
* TYPE:                                                                    *
*    [X ] PROGRAM        [ ] SUBROUTINE       [ ] FUNCTION                 *
*                                                                          *
* GENERAL DESCRIPTION:                                                     *
*                                                                          *
*      Draws a cross - section on the CRT or plotter.                      *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
* ACCESSED BY:                                                             *
*      CSEDO                                                               *
*                                                                          *
* LINKAGES:                                                                *
*                                                                          *
*      Retrieves common from system available memory.                      *
*                                                                          *
*                                                                          *
* EXTERNAL REFERENCES:                                                     *
*                                                                          *
*    RTE, FILE MANAGER, LIBRARY:                                           *
*      EXEC                                                                *
*                                                                          *
*                                                                          *
*                                                                          *
*    SPECIAL:                                                              *
*      TCS                                                                 *
*                                                                          *
*                                                                          *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                 *
*           /             /             /             /             /      *
*           /             /             /             /             /      *
*           /             /             /             /             /      *
*           /             /             /             /             /      *
*           /             /             /             /             /      *
*                                                                          *
* DATA FILES ACCESSED:                                                     *
*                                                                          *
*                                                                          *
*                                                                          *
****************************************************************************
```

```
************************************************************************
*                                                                      *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:                  *
*                                                                      *
* ROUTINE NAME: CSEDO                          AUTHOR: Conners         *
*                                                                      *
* REVISION CODE: 1.0                           DATE: 6/1/79            *
*                                                                      *
* LOCATION / ACCESS PROCEDURE: &CSEDO file                             *
*                                                                      *
* TYPE:                                                                *
*    [X] PROGRAM      [ ] SUBROUTINE      [ ] FUNCTION                 *
*                                                                      *
* GENERAL DESCRIPTION:                                                 *
*                                                                      *
*                                                                      *
*                                                                      *
*                                                                      *
*                                                                      *
*                                                                      *
*                                                                      *
*                                                                      *
* ACCESSED BY:                                                         *
*                     CSEDT                                            *
*                                                                      *
* LINKAGES:                                                            *
*                                                                      *
*                                                                      *
*                                                                      *
*                                                                      *
* EXTERNAL REFERENCES:                                                 *
*                                                                      *
*    RTE, FILE MANAGER, LIBRARY:                                       *
*     RMPAR           EXEC                                             *
*                                                                      *
*                                                                      *
*                                                                      *
*    SPECIAL:                                                          *
*     TCS             IDSEG         SWAP                               *
*                                                                      *
*                                                                      *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)             *
*     CSDRW /P        CODER /S          /          /          /        *
*           /               /           /          /          /        *
*           /               /           /          /          /        *
*           /               /           /          /          /        *
*           /               /           /          /          /        *
*                                                                      *
* DATA FILES ACCESSED:                                                 *
*                                                                      *
*                                                                      *
*                                                                      *
************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL:

ROUTINE NAME: CSEDT — AUTHOR: Conners

REVISION CODE: 1.0 — DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: & CSEDT

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Executive routine for cross section display and edit.

ACCESSED BY:
DENRV

LINKAGES:

Scheduled by DENRV; no parameters

EXTERNAL REFFRENCES:

RTE, FILE MANAGER, LIBRARY:
EXEC

SPECIAL:
TCS SPOLU SWAP

APPLICATION: (NAME/Program, Subroutine, OR Function)
CSEDO /P CSEOT /P CODER / S

DATA FILES ACCESSED:
GRIDS

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL:

ROUTINE NAME: CSEOT AUTHOR: Conners

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &CSEOT

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Writes edited grid data to new disc file.

ACCESSED BY:
CSEDT

LINKAGES:

Retrieves common from disc.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
EXEC RMPAR

SPECIAL:
TCS SPOLU

APPLICATION: (NAME/Program, Subroutine, OR Function)
UPDAT / S CODER / S

DATA FILES ACCESSED:
GRID

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL:

ROUTINE NAME: CS3DD AUTHOR: Conners

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: & CS3DD

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Draws three - dimensional cross sections of grid data.

ACCESSED BY:
DENRV

LINKAGES:

Scheduled by DRVED; receives no parameters.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
RMPAR

SPECIAL:
TCS SPOLU

APPLICATION: (NAME/Program, Subroutine, OR Function)
PLT3D /S FRAM 1 /S ROGRD /S

DATA FILES ACCESSED:
GRID

SEAMPLAN SOFTWARE DOCUMENTATION   LEVEL: 4

ROUTINE NAME: DATA   AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & DATA File

TYPE:
[ ] PROGRAM   [X] SUBROUTINE   [ ] FUNCTION

GENERAL DESCRIPTION:

DATA controls the input, updating and displaying of the simulation Data.

ACCESSED BY:
EXDRG

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
ERASE (TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
DSRCE / S   OPSEQ / S   UPCAS / S   UPFLG / S   UPSET / S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION | LEVEL:

ROUTINE NAME: DBE | AUTHOR: Elm

REVISION CODE: | DATE: 7/19/79

LOCATION / ACCESS PROCEDURE: File&DBE/ selected from ADMVI

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

DBE is the Flour Utah ADM model drilling and blasting macro model.

ACCESSED BY:

ADM

LINKAGES:

Logical units and subsystem selection plays LFEC, LFLP, LOGDB, LOGEC, passed on arguments. DBE Common Block also used.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

CODE(RTE)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

FLECRG

Figure ______ DBE Characteristics

```
***********************************************************************
*                                                                     *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:___2____________ *
*                                                                     *
* ROUTINE NAME:__DENRV_______                  AUTHOR:__Elm__________ *
*                                                                     *
* REVISION CODE:_____________                  DATE:____8/23/79______ *
*                                                                     *
* LOCATION / ACCESS PROCEDURE:______&DENRV file______________________ *
*                                                                     *
* TYPE:                                                               *
*     [X ] PROGRAM      [ ] SUBROUTINE      [ ] FUNCTION              *
*                                                                     *
* GENERAL DESCRIPTION:                                                *
*                                                                     *
*      DENRV is the data entry and review module executive.  It places *
* a menu on the screen, and schedule (swaps) the appropriate program  *
* based on user selection.                                            *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
* ACCESSED BY:                                                        *
*     __SPLAN___  __________  __________  __________  __________      *
*                                                                     *
* LINKAGES:                                                           *
*      None                                                           *
*                                                                     *
*                                                                     *
*                                                                     *
* EXTERNAL REFERENCES:                                                *
*                                                                     *
*    RTE, FILE MANAGER, LIBRARY:                                      *
*    __ANMOD (TCS) __CHSIZ (TCS) __ERASE (TCS) __EXEC (RTE) __INITI (TCS) *
*    __IOWAT (TCS) __NEWPG (TCS) __SPOLU (SYS) __________  __________ *
*    __________  __________  __________  __________  __________       *
*                                                                     *
*    SPECIAL:                                                         *
*    __SWAP____  __________  __________  __________  __________       *
*    __________  __________  __________  __________  __________       *
*                                                                     *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)            *
*    ________/_  ________/_  ________/_  ________/_  ________/_       *
*    ________/_  ________/_  ________/_  ________/_  ________/_       *
*    ________/_  ________/_  ________/_  ________/_  ________/_       *
*    ________/_  ________/_  ________/_  ________/_  ________/_       *
*    ________/_  ________/_  ________/_  ________/_  ________/_       *
*                                                                     *
* DATA FILES ACCESSED:                                                *
*    __________  __________  __________  __________  __________       *
*    __________  __________  __________  __________  __________       *
*                                                                     *
***********************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: DGINT — AUTHOR: M. Wagner

REVISION CODE: — DATE: 8/1/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY

TYPE:
[x] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

DGINT CONTROLS THE SWAPPING TO THE CORRECT DIGITIZING ROUTINE.

ACCESSED BY:
DENRV

LINKAGES:

IPRM

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
ANMOD (TCS) EXEC (RTE)
CHSIZ (TCS) INITT (TCS)
NEWPG (TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
CONCN / P
RNDIS / P
PTDTA / P

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 3

ROUTINE NAME: DIAGR

AUTHOR: Elm

REVISION CODE:

DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &DIAGR

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

DIAGR manages the production of casting diagrams.

ACCESSED BY:

PITON ANALY

LINKAGES: COMMON - Tektronix, 1 pass (MOD1) and 2 pass (MOD2) blocks;

Casting Diagram Graphics blocks.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

FINIT(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

CMPT / S DSGNC / S DRIVPL / S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: DIG — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & DIG

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

DIG sets up a procedure for each operation involving overburden removal to remove the necessary volume. It does the removal in layers.

ACCESSED BY:

OBR

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

BPWR /S   BUCKT /S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL:

ROUTINE NAME: DLINZ AUTHOR: Elm

REVISION CODE: DATE: 7/16/79

LOCATION / ACCESS PROCEDURE: &DLINZ

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Initializes dragline parameter Common area, G UNDEC, by reading #DRAG.

ACCESSED BY:

ADM(ADMF)

LINKAGES:

G VNDEC Common block

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

COOE SPOLU

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

#DRAG

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 2

ROUTINE NAME: DLS AUTHOR: Elm

REVISION CODE: DATE: 7/20/79

LOCATION / ACCESS PROCEDURE: &DLS / RVN ADM; RV, SPLAN

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

DLS is the Macro or 1st level dragline model. Equations are evaluated which estimates required dragline size and costs. And output save in a summary table. If the 2nd level routines were used to interactively design a dragline, sizing equation in BTDL and are bypassed, however.

ACCESSED BY:

ADM

LINKAGES:

GVNADM (ADM General) Common Block and GVNDEC (Dragline subsystems) Common Block Arguments: RNDNFLG- Design play passed from ADM LFEC- Support equipment option play LOGDL - Dragline subsystem selection play.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

CODE(RTE)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

BTDL / S

DATA FILES ACCESSED:

FLECRG

Figure ______ DLS Characteristics

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 2

ROUTINE NAME: DLS2 AUTHOR: Elm

REVISION CODE: DATE: 7/20/79

LOCATION / ACCESS PROCEDURE: &DLS2 / RV adm; RV SPLAN

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

DLS2 interfaces the 2nd level dragline models' with the ADM dragline subsystem by converting shared common block variables before and after interactive dragline designs, and by calling PITON, the 2nd level design executive.

ACCESSED BY:

ADMUI

LINKAGES: GVNADM and GUNDEC - FLUOR ADM Common Areas.

MICOM & MLCOM - one and 2 pass 2nd level model common block.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

PITON / S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: DMODS — AUTHOR: Elm

REVISION CODE: — DATE: 8/6/79

LOCATION / ACCESS PROCEDURE: &DMODS

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Selects proper dragline model and calls it (MOD1 or MOD2)

ACCESSED BY:
MOD1 PITDP

LINKAGES: Arguments ZMOD, ZCODE; Model selection and evaluation codes.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
MOD1 /S MOD2 /S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL:

ROUTINE NAME: DMPFL AUTHOR: Lehman

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &DMPFL file

TYPE:

[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Displays the content of a grid or X,Y,Z file on the line printer.

ACCESSED BY:

DENRV

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

RMPAR

SPECIAL:

TCS SPOLU OTSPL

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

X,Y,Z GRID

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: DPFIO — AUTHOR: Elm

REVISION CODE: — DATE: 8/23/79

LOCATION / ACCESS PROCEDURE: &DPFIO

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Reads #MINE file to obtain observed overburden depths (DPTTH) and coal seam thicknesses for Dynamic Programming optim atar. Also, writes out optimal widths to #MINE following D.P. conclusion.

ACCESSED BY:
FLEX

LINKAGES:

COMMON - IFCOM, M1COM, M2COM, DPCOM1 Blocks
ARGUMENTS - ICODE (real/write code)

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
CLDFL(%DAFMP) DFNFL(%DAFMP DREAD(%DAFMP) DWRIT(%DAFMP)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:
#MINE

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL:

ROUTINE NAME: DPLOT AUTHOR: Lehman

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &DPLOT ::17

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Searches the grid files in using the current pit layout as a mask to determine overburden depths and coal seam thickness.

ACCESSED BY:
PTLOT

LINKAGES:

Uses PTOPO common.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
RMPAR EXEC

SPECIAL:
SPOLU SWAP DAFMP

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:
GRIDS #MINE

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: DRAG — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & DRAG

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

DRAG sequences the simulator through the operations as specified by the operation data (5-44).

ACCESSED BY:

EXDRG

LINKAGES:

COMMON - Blank; M.D. Labeled Blocks.
Arguments - none.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

DATE (sys) IDENT (sys) SPOLU (sys)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

BFL /S BNR /S INTT /S MOVE/S OBS /S
PFLLE /S

DATA FILES ACCESSED:

LU6, LU5, LU7

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 3

ROUTINE NAME: DRAGL AUTHOR: Elm

REVISION CODE: DATE: 7/30/79

LOCATION / ACCESS PROCEDURE:

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

DRAGL draws the dragline in either view (plan or cross-section), excluding the tracks of feet in the cross-section view.

ACCESSED BY:

DRWPL DRWXS

LINKAGES: COMMON - Tektronix, MOD1, MOD2, and DIAGR Common Block

Arguments - XOFF, YOFF, Z VIEW, SCALE; offset, paln or cross-section play, and scale portion.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD(TCS) BELL(TCS) DRAWA(TCS) DRAWR(DSP) HOME(TCS)
MOVEA(TCS) MOVER(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

BOOM /S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: DRAWM — AUTHOR: M. Wagner

REVISION CODE: — DATE: 8/3/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This subroutine is designed to be used by DIGITIZING output routines. It is designed to sketch an outline of map in the biggest allowable screen area while not allowing any distortion.

ACCESSED BY:
Digitizing output routines.

LINKAGES:

XMIN, XMAX, YMIN, YMAX, GRINT, MXS, MYS, (as described in the subroutines)

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD (TCS)	DRWRL (TCS)	INITT (TCS)	MOVRL (TCS)	
CHSIZ (TCS)	ERASE (RTE)	MOVAB (TCS)	SWNDO (TCS)	
DRWAB (TCS)		MOVEA (TCS)	VWNDO (TCS)	

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: ____________

ROUTINE NAME: DRNG

AUTHOR: Lehman

REVISION CODE: 1.0

DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &PTLOT :: 17

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Uses crosshair cursors to determine the pit design range: the distance from the edge of the last pit to be analyzed.

ACCESSED BY:

PTLOT

LINKAGES:

Arguments include the screen location for text display; uses PTOPT common.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

TCS

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
*****************************************************************************
*                                                                           *
* SEAMPLAN SOFTWARE DOCUMENTATION                  LEVEL: 3                 *
*                                                                           *
* ROUTINE NAME: DRSPL                              AUTHOR: Elm              *
*                                                                           *
* REVISION CODE: ______________                    DATE: 8/9/79             *
*                                                                           *
* LOCATION / ACCESS PROCEDURE: &DRSPL                                       *
*                                                                           *
* TYPE:                                                                     *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                      *
*                                                                           *
* GENERAL DESCRIPTION:                                                      *
*                                                                           *
*       Identifies location of individual cut's material in the spoil      *
*  pile (cross - section) and labels.                                       *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
* ACCESSED BY:                                                              *
*    EBNCH       __________  __________  __________  __________             *
*                                                                           *
* LINKAGES:                                                                 *
*       COMMON Tektronix, M1COM, M2COM, and DIAGR blocks.                   *
*       Arguments WIDTH, ICHAR, WC,CC; spoil geometry parameters and        *
*  identifying characters for the cut.                                      *
*                                                                           *
* EXTERNAL REFERENCES:                                                      *
*                                                                           *
*    RTE, FILE MANAGER, LIBRARY:                                            *
*    AMOD (TCS)  DASHR (TCS)  MOVEA (TCS)  __________  __________           *
*    __________  __________  __________  __________  __________             *
*    __________  __________  __________  __________  __________             *
*                                                                           *
*    SPECIAL:                                                               *
*    __________  __________  __________  __________  __________             *
*    __________  __________  __________  __________  __________             *
*                                                                           *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                  *
*    ________/_  ________/_  ________/_  ________/_  ________/_             *
*    ________/_  ________/_  ________/_  ________/_  ________/_             *
*    ________/_  ________/_  ________/_  ________/_  ________/_             *
*    ________/_  ________/_  ________/_  ________/_  ________/_             *
*    ________/_  ________/_  ________/_  ________/_  ________/_             *
*                                                                           *
* DATA FILES ACCESSED:                                                      *
*    __________  __________  __________  __________  __________             *
*    __________  __________  __________  __________  __________             *
*                                                                           *
*****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 3

ROUTINE NAME: DRWPL AUTHOR: Elm

REVISION CODE: DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &DRWPL

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

DRWPL manages the graphical portion of the casting diagram display

ACCESSED BY:
DIAGR

LINKAGES: Tektronix, 1 pass, 2 pass and Diagramming COMMON BLOCK.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD(TCS)	CHSLZ(TCS)	DASHA(TCS)	DASHR(TCS)	DRAWA(TCS)
DRAWL(TCS)	MOVAB(TCS)	MOVEA(TCS)	SWNDO(TCS)	VWNDO(TCS)
GETLU(DSP				

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DRAGL/S	DRWXS/S	EBNCIT/S	HUB/S	ROTAT/S
SHADE/S	VERB/			

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: DRWXS — AUTHOR: Elm

REVISION CODE: — DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &DRWXS

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

DRWXS draws the cross section of the casting diagram.

ACCESSED BY:
DRWPL

LINKAGES: COMMON Tektronix, 1 pass and 2 pass models (MOD1, MOD2), and Diagram Blocks. Arguments - WIDE, SCALE, Y RANGE - dimension variables.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD(TCS)	DASHR(TCS)	DRAWA(TCS)	DRAWR(TCS)	DRWRL(TCS)
GETLU(DSP)	MOVAB(TCS)	MOVEA(TCS)	SWNDO(TCS)	VWNDO(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DRAG L /S	EBNCH /S	HUB /S	TRACK /S	VERB /S

DATA FILES ACCESSED:

```
*****************************************************************
*                                                               *
* SEAMPLAN SOFTWARE DOCUMENTATION          LEVEL: 3             *
*                                                               *
* ROUTINE NAME: DSGNC                      AUTHOR: Elm          *
*                                                               *
* REVISION CODE:                           DATE: 8/9/79         *
*                                                               *
* LOCATION / ACCESS PROCEDURE: &DSGNC                           *
*                                                               *
* TYPE:                                                         *
*    [ ] PROGRAM      [X ] SUBROUTINE      [ ] FUNCTION         *
*                                                               *
* GENERAL DESCRIPTION:                                          *
*                                                               *
*      DSGNC produces verbal dragline design descriptions to the left of *
*   casting diagrams for DIAGR.                                 *
*                                                               *
*                                                               *
*                                                               *
*                                                               *
*                                                               *
* ACCESSED BY:                                                  *
*    DIAGR                                                      *
*                                                               *
* LINKAGES:                                                     *
*      COMMON -Tektronix, MOD1 and MOD2 and DIAGR blocks.       *
*                                                               *
*                                                               *
*                                                               *
* EXTERNAL REFERENCES:                                          *
*                                                               *
*    RTE, FILE MANAGER, LIBRARY:                                *
*      BELL (TCS)   CHSIZ (TCS)   ERASE (TCS)   GETLL(DSP)   HOME (TCS) *
*                                                               *
*                                                               *
*                                                               *
*    SPECIAL:                                                   *
*                                                               *
*                                                               *
*                                                               *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)      *
*         /           /           /           /           /     *
*         /           /           /           /           /     *
*         /           /           /           /           /     *
*         /           /           /           /           /     *
*         /           /           /           /           /     *
*                                                               *
* DATA FILES ACCESSED:                                          *
*                                                               *
*                                                               *
*                                                               *
*****************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: DSPAC

AUTHOR: Elm

REVISION CODE:

DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & DSPAC

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Displays parameter types and possible update activities for the parameter data.

ACCESSED BY:

UPSET

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

HOME(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: DSPDS AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & DSPDS

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Displays current source assignments for various data types.

ACCESSED BY:
DSRCE

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
HOME (TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: DSPOD — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & DSPOD

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Displays (on the CRT) the elements of a particular operation for the dragline simulation.

ACCESSED BY:

OPSEQ OPDUP

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

HOME (TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: DSPPD AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & DSPPD

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Displays parameter data on the CRT prior to update.

ACCESSED BY:
UPSET

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
ERASE (TCS) HOME (TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
WRHOR / S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: DSPSQ AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & DSPSQ

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Displays and prints the sequence of operations for the dragline simulation

ACCESSED BY:

OPSEQ

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

DATE (SYS) HOME (TCS) IDENT (SYS) SPOLU (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: DSRCE — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & DSRCE

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Controls the source of simulation data (operation, case, flag and parameter).

ACCESSED BY:
DATA

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
ERASE (TCS) SPOLU (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
DSPDS /S OPSEQ / S UPCAS/S UPFLG / S UPSET /S

DATA FILES ACCESSED:
Source data file

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: DSSAC AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & DSSAC

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Displays operation update activities when the operation data source is the CRT.

ACCESSED BY:

OPSEQ

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

HOME (TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: DTOT AUTHOR: ELm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & DTOT

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Displays and prints totals and averages for each type of operation simulated as well as totals for the run (5-50).

ACCESSED BY:

DRAG

LINKAGES:

COMMON - Blank; M.D. Labeled blocking
Arguments - none.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ERASE (TCS) IDENT (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

AOBR /S

DATA FILES ACCESSED: (assignments vary)

LU5 LU6

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: DUMP AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & DUMP

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Searches the spoil pile for a dump location for a spoiling operation cycle. When one is found, the swing angle and X, Y coordinates of the location are calculated.

ACCESSED BY:

OBR

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

NINT/F RTHTA/S

DATA FILES ACCESSED:

```
***********************************************************************
*                                                                     *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL: 3               *
*                                                                     *
* ROUTINE NAME: EBNCH                          AUTHOR: Elm            *
*                                                                     *
* REVISION CODE: ____________                  DATE: 8/9/79           *
*                                                                     *
* LOCATION / ACCESS PROCEDURE: &EBNCH                                 *
*                                                                     *
* TYPE:                                                               *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                *
*                                                                     *
* GENERAL DESCRIPTION:                                                *
*                                                                     *
*       EBNCH is called to produce drawings of extended and /or side  *
*  benches in both plan and cross section views.  Geometric equations *
*  must be in agreement with those used in MOD1 and MOD2.             *
*                                                                     *
*                                                                     *
*                                                                     *
*                                                                     *
* ACCESSED BY:                                                        *
*    DRWPL     DRWXS     ________  ________  ________                 *
*                                                                     *
* LINKAGES:                                                           *
*                                                                     *
*       COMMON - Tektronix, MOD1,MOD2,and DIAGR.                      *
*                                                                     *
*                                                                     *
* EXTERNAL REFERENCES:                                                *
*                                                                     *
*    RTE, FILE MANAGER, LIBRARY:                                      *
*    ANMOD (TCS)  DASHA (TCS)  DRAWR (TCS)  GETLU (DSP)  MOVEA (TCS)  *
*    MOVER (TCS)  ________  ________  ________  ________              *
*    ________  ________  ________  ________  ________                 *
*                                                                     *
*    SPECIAL:                                                         *
*    ________  ________  ________  ________  ________                 *
*    ________  ________  ________  ________  ________                 *
*                                                                     *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)            *
*    DRWSPL/S  ______/_  ______/_  ______/_  ______/_                 *
*    ______/_  ______/_  ______/_  ______/_  ______/_                 *
*    ______/_  ______/_  ______/_  ______/_  ______/_                 *
*    ______/_  ______/_  ______/_  ______/_  ______/_                 *
*    ______/_  ______/_  ______/_  ______/_  ______/_                 *
*                                                                     *
* DATA FILES ACCESSED:                                                *
*    ________  ________  ________  ________  ________                 *
*    ________  ________  ________  ________  ________                 *
*                                                                     *
***********************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: ____

ROUTINE NAME: EFC AUTHOR: Orville Green

REVISION CODE: ____ DATE: 6-15-79

LOCATION / ACCESS PROCEDURE: IEFC

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

EFC checks for forbidden or required reclamation alternatives.

ACCESSED BY:

LUOS

LINKAGES:

CLAIM common
Argument: LUORNS

EXTERNAL REFERENCES: None

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: EXDRG — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & EXDRG

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Dragline simulation main program. Calls DATA to initialize parameters and DRAG to perform the simulation.

ACCESSED BY:

ADMUI (MD)

LINKAGES:

Blank COMMON, Labeled COMMON (ADM & M.D. blocks),
Arguments - MODE, MTHD

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

DATE (SYS) SPOLU (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
**********************************************************************
*                                                                    *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:___3___________ *
*                                                                    *
* ROUTINE NAME:__ECNQD________                 AUTHOR:___EJm_________ *
*                                                                    *
* REVISION CODE:______________                 DATE:____8/16/79______ *
*                                                                    *
* LOCATION / ACCESS PROCEDURE:______&ECNQD___________________________ *
*                                                                    *
* TYPE:                                                              *
*    [ ] PROGRAM      [ ] SUBROUTINE      [X] FUNCTION               *
*                                                                    *
* GENERAL DESCRIPTION:                                               *
*                                                                    *
*       Solves a quadratic using binomial theorem.                   *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
* ACCESSED BY:                                                       *
*    ___SPNCF___  ___________  ___________  ___________  ___________ *
*                                                                    *
* LINKAGES:                                                          *
*                                                                    *
*       Arguments:  AQ, BQ, CQ.                                      *
*                                                                    *
*                                                                    *
* EXTERNAL REFERENCES:                                               *
*                                                                    *
*    RTE, FILE MANAGER, LIBRARY:                                     *
*    ___________  ___________  ___________  ___________  ___________ *
*    ___________  ___________  ___________  ___________  ___________ *
*    ___________  ___________  ___________  ___________  ___________ *
*                                                                    *
*    SPECIAL:                                                        *
*    ___________  ___________  ___________  ___________  ___________ *
*    ___________  ___________  ___________  ___________  ___________ *
*                                                                    *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)           *
*    _________/_  _________/_  _________/_  _________/_  _________/_ *
*    _________/_  _________/_  _________/_  _________/_  _________/_ *
*    _________/_  _________/_  _________/_  _________/_  _________/_ *
*    _________/_  _________/_  _________/_  _________/_  _________/_ *
*    _________/_  _________/_  _________/_  _________/_  _________/_ *
*                                                                    *
* DATA FILES ACCESSED:                                               *
*    ___________  ___________  ___________  ___________  ___________ *
*    ___________  ___________  ___________  ___________  ___________ *
*                                                                    *
**********************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 2

ROUTINE NAME: FDLQ AUTHOR: Elm

REVISION CODE: DATE: 7/20/79

LOCATION / ACCESS PROCEDURE: &FDLQ file / RV, ADM; RU, SPLAN

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

FDLQ interactively estimates dragline size requirements (boom length, bucket size) for the mine area.

ACCESSED BY:

BTDL

LINKAGES:

GVNADM Common area, GVNDEC Common area; Arguments YQ,YR,YW; Reach (computed), Reach (initial), bucket size.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
*****************************************************************************
*                                                                           *
* SEAMPLAN SOFTWARE DOCUMENTATION                 LEVEL:                    *
*                                                                           *
* ROUTINE NAME: FILBF                             AUTHOR: Lehman            *
*                                                                           *
* REVISION CODE:1.0                               DATE: 6/1/79              *
*                                                                           *
* LOCATION / ACCESS PROCEDURE: & TRD file                                   *
*                                                                           *
* TYPE:                                                                     *
*     [ ] PROGRAM       [X] SUBROUTINE       [ ] FUNCTION                   *
*                                                                           *
* GENERAL DESCRIPTION:                                                      *
*                                                                           *
*      Fills buffer (vector) with row or column of grid data for three      *
*                                                                           *
*      dimensional display.                                                 *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
* ACCESSED BY:                                                              *
*     TRD                                                                   *
*                                                                           *
* LINKAGES:                                                                 *
*                                                                           *
*      Uses arguments and TRD common block.                                 *
*                                                                           *
*                                                                           *
* EXTERNAL REFERENCES:                                                      *
*                                                                           *
*    RTE, FILE MANAGER, LIBRARY:                                            *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*    SPECIAL:                                                               *
*                                                                           *
*                                                                           *
*                                                                           *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                  *
*          /          /          /          /          /                    *
*          /          /          /          /          /                    *
*          /          /          /          /          /                    *
*          /          /          /          /          /                    *
*          /          /          /          /          /                    *
*                                                                           *
* DATA FILES ACCESSED:                                                      *
*                                                                           *
*                                                                           *
*                                                                           *
*****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 3

ROUTINE NAME: FLEX AUTHOR: Elm

REVISION CODE: DATE: 8/6/79

LOCATION / ACCESS PROCEDURE: &FLEX file

TYPE:

[ ] PROGRAM [x] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

FLEX provides the interface between the 2nd design level dragline models, MOD 1 and MOD2, as well as the Flexible Tolerance optimization code and the PITON program segment.

ACCESSED BY:

PITON ANALY

LINKAGES:

COMMON - Flexible Tolerance, MOD1, MOD2, and dynamic programming (PITDP) common blocks Arguments - I CODE, ZMOD, NNX, NNIC, NNC; use code, model code and NLP size variables.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

IDSEG(SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DPFZO / S FTOL / S MODL / S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL:

ROUTINE NAME: FRAM1 AUTHOR: Conners

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &CS3DD

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Draws frames below three dimensional cross section displays.

ACCESSED BY:

CS3DD

LINKAGES:

Arguments VERTEX and ADDY.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

TCS

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL:

ROUTINE NAME: FRAMR — AUTHOR: Lehman

REVISION CODE: 1.0 — DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: & PLT3D file

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Draws frame on three dimenional display.

ACCESSED BY:
TRD

LINKAGES:

Arguments containing vertex coordinate and index of front coordinate.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:
TCS

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
*****************************************************************************
*                                                                           *
* SEAMPLAN SOFTWARE DOCUMENTATION               LEVEL:____3_______________  *
*                                                                           *
* ROUTINE NAME:__FYB23_________                 AUTHOR:___Elm_____________  *
*                                                                           *
* REVISION CODE:_______________                 DATE:_____8/16/79_________  *
*                                                                           *
* LOCATION / ACCESS PROCEDURE:________&FYB23________________________________ *
*                                                                           *
* TYPE:                                                                     *
*    [ ] PROGRAM      [ ] SUBROUTINE      [X] FUNCTION                      *
*                                                                           *
* GENERAL DESCRIPTION:                                                      *
*                                                                           *
*       Computes rehandle area  Centroid for 2-pass dragline model.         *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
* ACCESSED BY:                                                              *
*    ____TIME_____  _____________  _____________  _____________  __________ *
*                                                                           *
* LINKAGES:                                                                 *
*                                                                           *
*         COMMON - IFCOM (Flexible tolerance), M1COM, M2COM, T2COM          *
*         Argument - DUM (not used)                                         *
*                                                                           *
* EXTERNAL REFERENCES:                                                      *
*                                                                           *
*    RTE, FILE MANAGER, LIBRARY:                                            *
*    _____________  _____________  _____________  _____________  __________ *
*    _____________  _____________  _____________  _____________  __________ *
*    _____________  _____________  _____________  _____________  __________ *
*                                                                           *
*    SPECIAL:                                                               *
*    _____________  _____________  _____________  _____________  __________ *
*    _____________  _____________  _____________  _____________  __________ *
*                                                                           *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                  *
*    __________/_   __________/_   __________/_   __________/_   ________/_ *
*    __________/_   __________/_   __________/_   __________/_   ________/_ *
*    __________/_   __________/_   __________/_   __________/_   ________/_ *
*    __________/_   __________/_   __________/_   __________/_   ________/_ *
*    __________/_   __________/_   __________/_   __________/_   ________/_ *
*                                                                           *
* DATA FILES ACCESSED:                                                      *
*    _____________  _____________  _____________  _____________  __________ *
*    _____________  _____________  _____________  _____________  __________ *
*                                                                           *
*****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 2

ROUTINE NAME: GAA AUTHOR: Elm

REVISION CODE: DATE: 7/19/79

LOCATION / ACCESS PROCEDURE: &GAA

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

The GAA routine evaluates the ADM Macro General and Administrative Expense Model and ouputs results to the user and the Cas Flow Analysis program data file, FLECRG.

ACCESSED BY:
ADM

LINKAGES:

GAA Common Block Arguments: LFEC, LFLP - Logical Units
LOGPD, LOGPE - Option flags

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
CODE(RTE)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:
FLECRG

SEAMPLAN SOFTWARE DOCUMENTATION   LEVEL: 3

ROUTINE NAME: GETD   AUTHOR: Elm

REVISION CODE: ____   DATE: 8/23/79

LOCATION / ACCESS PROCEDURE: &GETD

TYPE:
[ ] PROGRAM   [X] SUBROUTINE   [ ] FUNCTION

GENERAL DESCRIPTION:

Interpolates between overburden and coal seam thickness observation points to get values at a particular stage coordinate relative to YEDGE

ACCESSED BY:
RETRN   PITDP

LINKAGES:

COMMON - IFCOM, M1COM, M2COM, DPCOM1
ARGUMENTS - SI, SIP1, D, T.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
*******************************************************************************
*                                                                             *
* SEAMPLAN SOFTWARE DOCUMENTATION                    LEVEL:____2__________    *
*                                                                             *
* ROUTINE NAME:__GRCNT________                       AUTHOR:___M.J.W._______  *
*                                                                             *
* REVISION CODE:______________                       DATE:____8/23/79_______  *
*                                                                             *
* LOCATION / ACCESS PROCEDURE:____________________________________________    *
*                                                                             *
* TYPE:                                                                       *
*    [X] PROGRAM        [ ] SUBROUTINE        [ ] FUNCTION                    *
*                                                                             *
* GENERAL DESCRIPTION:                                                        *
*                                                                             *
*       GRCNT allows the user to select programs which convert alphanumeric   *
*  X,Y,Z data file to sorted binary X,Y,Z  ~~0~~ Stampede formatted files, and      *
*  these files into Grid file.                                                *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* ACCESSED BY:                                                                *
*    ___DENRU___   ___________   ___________   ___________   ___________      *
*                                                                             *
* LINKAGES:                                                                   *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* EXTERNAL REFERENCES:                                                        *
*                                                                             *
*    RTE, FILE MANAGER, LIBRARY:                                              *
*    ___CHSIZ (ICS   ___INIIT (ICS)   __NEWPG (ICS)   ___________   _________ *
*    ___________   ___________   ___________   ___________   ___________      *
*    ___________   ___________   ___________   ___________   ___________      *
*                                                                             *
*    SPECIAL:                                                                 *
*    ___SWAP____   ___________   ___________   ___________   ___________      *
*    ___________   ___________   ___________   ___________   ___________      *
*                                                                             *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                    *
*    _________/_   _________/_   _________/_   _________/_   _________/_      *
*    _________/_   _________/_   _________/_   _________/_   _________/_      *
*    _________/_   _________/_   _________/_   _________/_   _________/_      *
*    _________/_   _________/_   _________/_   _________/_   _________/_      *
*    _________/_   _________/_   _________/_   _________/_   _________/_      *
*                                                                             *
* DATA FILES ACCESSED:                                                        *
*    ___________   ___________   ___________   ___________   ___________      *
*    ___________   ___________   ___________   ___________   ___________      *
*                                                                             *
*******************************************************************************
```

```
***************************************************************************
*                                                                         *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:....................  *
*                                                                         *
* ROUTINE NAME: GRDIN                          AUTHOR: Lehman              *
*                                                                         *
* REVISION CODE: 1.0                           DATE: 6/1/79               *
*                                                                         *
* LOCATION / ACCESS PROCEDURE: & GRDIN                                    *
*                                                                         *
* TYPE:                                                                   *
*    [X] PROGRAM      [ ] SUBROUTINE      [ ] FUNCTION                    *
*                                                                         *
* GENERAL DESCRIPTION:                                                    *
*                                                                         *
*      Utility to read grid data file and pass back grid and header       *
*                                                                         *
*      data to calling program.                                           *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
* ACCESSED BY:                                                            *
*      TOPO          TRD          PTLOT          DPLOT                    *
*                                                                         *
* LINKAGES:                                                               *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
* EXTERNAL REFERENCES:                                                    *
*                                                                         *
*    RTE, FILE MANAGER, LIBRARY:                                          *
*      EXEC          RMPAR                                                *
*                                                                         *
*                                                                         *
*                                                                         *
*    SPECIAL:                                                             *
*      TCS           SPOLU                                                *
*                                                                         *
*                                                                         *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                *
*            /            /            /            /            /        *
*            /            /            /            /            /        *
*            /            /            /            /            /        *
*            /            /            /            /            /        *
*            /            /            /            /            /        *
*                                                                         *
* DATA FILES ACCESSED:                                                    *
*      GRID                                                               *
*                                                                         *
*                                                                         *
***************************************************************************
```

```
*****************************************************************************
*                                                                           *
* SEAMPLAN SOFTWARE DOCUMENTATION                  LEVEL:                   *
*                                                                           *
* ROUTINE NAME: GRDNT                              AUTHOR: Conners          *
*                                                                           *
* REVISION CODE: 1.0                               DATE: 6/1/79             *
*                                                                           *
* LOCATION / ACCESS PROCEDURE: &GRDNT                                       *
*                                                                           *
* TYPE:                                                                     *
*    [X] PROGRAM      [ ] SUBROUTINE      [ ] FUNCTION                      *
*                                                                           *
* GENERAL DESCRIPTION:                                                      *
*                                                                           *
*      Establishes a set of grid values for a grid having limits and / or   *
*                                                                           *
*      a mesh interval different from that of a source grid.                *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
* ACCESSED BY:                                                              *
*    DENRV                                                                  *
*                                                                           *
* LINKAGES:                                                                 *
*                                                                           *
*      Retrieved user terminal logical unit using RMPAR                     *
*                                                                           *
*                                                                           *
* EXTERNAL REFERENCES:                                                      *
*                                                                           *
*    RTE, FILE MANAGER, LIBRARY:                                            *
*    RMPAR                                                                  *
*                                                                           *
*                                                                           *
*                                                                           *
*    SPECIAL:                                                               *
*    SPOLU                                                                  *
*                                                                           *
*                                                                           *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                  *
*          /             /             /             /             /        *
*          /             /             /             /             /        *
*          /             /             /             /             /        *
*          /             /             /             /             /        *
*          /             /             /             /             /        *
*                                                                           *
* DATA FILES ACCESSED:                                                      *
*    GRID                                                                   *
*                                                                           *
*                                                                           *
*****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 3

ROUTINE NAME: GRFF AUTHOR: W. Larson

REVISION CODE: DATE: 5/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This is a bargraph routine designed to let user define his own red flag level.

ACCESSED BY:
COREL

LINKAGES:

ITEK, and COMMON block from COREL.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD(TCS)	DRAWA(TCS)	EXEC(RTE)	MOVEA(TCS)	RMPAR(SYS)
CHSIZ(TCS)	DRWRL(TCS)	HOME(TCS)	MOVRL(TCS)	SWNDO(TCS)
DASHR(TCS)	ERASE(TCS)	MOVAB(TCS)	RESTT(ZDSPP)	VCRSR(TCS)
VWNDO(TCS)	SVSTT(TCS)			

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

INTER / S
XLINE / S
SORT / S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 3

ROUTINE NAME: HUB AUTHOR: Elm

REVISION CODE: DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &HUB

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

HUB draws the dragline hub for the cross-section view draws swing areas and locations in plan view.

ACCESSED BY:
DRWPL DRWXS

LINKAGES: COMMON - Tektronix, MOD1, MOD2, and DIAGR blocks

Arguments - Z VIEW, XOFF , SCALE, ILABL; view selection, offset, sealing, and partial draw .

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
ANMOD(TCS) DRAWR(TCS) GETLU(DSP) MOVEA(TCS) MOVER(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
ROTAT /S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: INAM — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & INAM

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Interacts with user to determine command source and save file name, as well as the cycle control parameter (5-53).

ACCESSED BY:
EXDRG

LINKAGES:

COMMON _ Blank; M.D. Labeled.
Arguments - MODE, MTHD

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
DATE (SYS) SPOLU (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:
Source Data file (user determined)

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 3

ROUTINE NAME: INIT1 AUTHOR: Elm

REVISION CODE: DATE: 8/16/79

LOCATION / ACCESS PROCEDURE: &INIT 1

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

INIT1 is called to read the #MOD1 file for i pass model evaluation if FLEX is run alone (ICODE 0 and IMOD =1)

ACCESSED BY:

MOD1

LINKAGES:

COMMON - Flexible tolerance, M1COM, T1COM blocks

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPOLU (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

#MOD1

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL:

ROUTINE NAME: INPT — AUTHOR: W. Larson

REVISION CODE: — DATE: 5/79

LOCATION / ACCESS PROCEDURE: CORE HOLE CONSTRUCTION AND VERIFICATION

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

CONVERTS Type 2 files (Built by program BUILD) to keyed access files for use by the core hole analysis option of Data Entry and Review

ACCESSED BY:

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

CLOSE (RTE) CLOSK(%KAFMP) EXEC(RTE) OPEN(RTE) READF(RTE)
SETUP (%KAFMP) SPOLU (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

BLANK /S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: INTER AUTHOR: W. Larson

REVISION CODE: DATE: 5/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

User interaction for test hole correlations

ACCESSED BY:

GRFF

LINKAGES:

1X,1Y,IPLACE, 1ANS, RFLAG, NAM, 1USER, 1STRT

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD(TCS)	MOVAB(TCS)
BMLOC(TCS)	MOVRL(TCS)
HOME (TCS)	SWNDO(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
******************************************************************************
*                                                                            *
* SEAMPLAN SOFTWARE DOCUMENTATION                    LEVEL:___4_____________ *
*                                                                            *
* ROUTINE NAME:__INTT_________                       AUTHOR:__Elm___________ *
*                                                                            *
* REVISION CODE:______________                       DATE:____8-25-79_______ *
*                                                                            *
* LOCATION / ACCESS PROCEDURE:__&_INTT_____________________________________ *
*                                                                            *
* TYPE:                                                                      *
*    [ ] PROGRAM        [X] SUBROUTINE        [ ] FUNCTION                   *
*                                                                            *
* GENERAL DESCRIPTION: Originally named INT:                                 *
*                                                                            *
*      Assigns file name to store results, initializes the overburden grid   *
*      array, NH, and several simulation parameters (5-60).                  *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
* ACCESSED BY:                                                               *
*    __DRAG____  __________  __________  __________  __________              *
*                                                                            *
* LINKAGES:                                                                  *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
* EXTERNAL REFERENCES:                                                       *
*                                                                            *
*    RTE, FILE MANAGER, LIBRARY:                                             *
*    ERASE_(TCS)_  IDENT_(SYS)_  SPOLU_(SYS)_  __________  __________        *
*    __________  __________  __________  __________  __________              *
*    __________  __________  __________  __________  __________              *
*                                                                            *
*    SPECIAL:                                                                *
*    __________  __________  __________  __________  __________              *
*    __________  __________  __________  __________  __________              *
*                                                                            *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                   *
*    _NH_______/E  _NINT____/F  _PINIT____/S  _PUTNH____/S  _SHGT____/S      *
*    _SUOL_____/S  _________/_  __________/_  __________/_  _________/_      *
*    __________/_  _________/_  __________/_  __________/_  _________/_      *
*    __________/_  _________/_  __________/_  __________/_  _________/_      *
*    __________/_  _________/_  __________/_  __________/_  _________/_      *
*                                                                            *
* DATA FILES ACCESSED:                                                       *
*    __________  __________  __________  __________  __________              *
*    __________  __________  __________  __________  __________              *
*                                                                            *
******************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: ______

ROUTINE NAME: LINE AUTHOR: Lehman

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &PTLOT :: 17

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Calculates the coeffricients of a line which passes through two points.

ACCESSED BY:

LINKAGES:

Arguments are coordinates of points on line; returns coefficients of line.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
******************************************************************************
*                                                                            *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL: 2                      *
*                                                                            *
* ROUTINE NAME: LRS                            AUTHOR: Elm                   *
*                                                                            *
* REVISION CODE:                               DATE: 7/19/79                 *
*                                                                            *
* LOCATION / ACCESS PROCEDURE: &LRS / RU,ADM or RV,SPLAN                     *
*                                                                            *
* TYPE:                                                                      *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                       *
*                                                                            *
* GENERAL DESCRIPTION:                                                       *
*                                                                            *
*       LRS is the subroutine which contain the original FLUOR macro         *
*                                                                            *
*       reclamation subsystem model or well as code added at MSU to control  *
*                                                                            *
*       selection of the FLUOR Micro Reclamation Model (SEAMPLAN Reclamation *
*                                                                            *
*       level 2) or the CLAIM program (level 3)                              *
* ACCESSED BY:                                                               *
*    ADM                                                                     *
*                                                                            *
* LINKAGES:                                                                  *
*                                                                            *
*       LRS Common Block                                                     *
*                                                                            *
*       LFEC, LFLP, LOGEC - grguments for logical units and option palys.    *
* EXTERNAL REFERENCES:                                                       *
*                                                                            *
*    RTE, FILE MANAGER, LIBRARY:                                             *
*    CHSIZ(TCS)    CODE(RTE)    ERASE(TCS)    RNITT(TCS)                     *
*                                                                            *
*                                                                            *
*                                                                            *
*    SPECIAL:                                                                *
*                                                                            *
*                                                                            *
*                                                                            *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                   *
*    MLRS     /S        /           /           /           /                *
*             /         /           /           /           /                *
*             /         /           /           /           /                *
*             /         /           /           /           /                *
*             /         /           /           /           /                *
*                                                                            *
* DATA FILES ACCESSED:                                                       *
*    FLECRG                                                                  *
*                                                                            *
*                                                                            *
******************************************************************************
```

```
*********************************************************************
*                                                                   *
* SEAMPLAN SOFTWARE DOCUMENTATION            LEVEL:________________ *
*                                                                   *
* ROUTINE NAME:_LUOS__________               AUTHOR:__Orville Green_ *
*                                                                   *
* REVISION CODE:______________               DATE:____6-15-79______ *
*                                                                   *
* LOCATION / ACCESS PROCEDURE:_& LUDS______________________________ *
*                                                                   *
* TYPE:                                                             *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION              *
*                                                                   *
* GENERAL DESCRIPTION:                                              *
*                                                                   *
*      Allow selection of post mine land use                        *
*                                                                   *
*                                                                   *
*                                                                   *
*                                                                   *
*                                                                   *
*                                                                   *
* ACCESSED BY:                                                      *
*    __RCLAM___  __________  __________  __________  __________     *
*                                                                   *
* LINKAGES:                                                         *
*                                                                   *
*      CLAIM COMMON                                                 *
*      Argument for returning planting cost                         *
*                                                                   *
* EXTERNAL REFERENCES:                                              *
*                                                                   *
*    RTE, FILE MANAGER, LIBRARY:                                    *
*    __________  __________  __________  __________  __________     *
*    __________  __________  __________  __________  __________     *
*    __________  __________  __________  __________  __________     *
*                                                                   *
*    SPECIAL:                                                       *
*    __SPOLU___  __________  __________  __________  __________     *
*    __________  __________  __________  __________  __________     *
*                                                                   *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)          *
*    __EFC___/S  ________/_  ________/_  ________/_  ________/_     *
*    __ALTRN_/S  ________/_  ________/_  ________/_  ________/_     *
*    ________/_  ________/_  ________/_  ________/_  ________/_     *
*    ________/_  ________/_  ________/_  ________/_  ________/_     *
*    ________/_  ________/_  ________/_  ________/_  ________/_     *
*                                                                   *
* DATA FILES ACCESSED:                                              *
*    __RVD_____  __________  __________  __________  __________     *
*    __________  __________  __________  __________  __________     *
*                                                                   *
*********************************************************************
```

```
*****************************************************************************
*                                                                           *
* SEAMPLAN SOFTWARE DOCUMENTATION                    LEVEL: ................*
*                                                                           *
* ROUTINE NAME: MAKFL                                AUTHOR: Eastman        *
*                                                                           *
* REVISION CODE: 1.0                                 DATE: 6/1/79           *
*                                                                           *
* LOCATION / ACCESS PROCEDURE: &MAKFL file                                  *
*                                                                           *
* TYPE:                                                                     *
*    [X] PROGRAM       [ ] SUBROUTINE       [ ] FUNCTION                    *
*                                                                           *
* GENERAL DESCRIPTION:                                                      *
*                                                                           *
*      Reads ASCII X,Y,Z, data, sorts it, writes BINARY X,Y,Z data.         *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
* ACCESSED BY:                                                              *
*      DENRV                                                                *
*                                                                           *
* LINKAGES:                                                                 *
*                                                                           *
*      Uses RMPAR to determine user terminal Logical unit.                  *
*                                                                           *
*                                                                           *
* EXTERNAL REFERENCES:                                                      *
*                                                                           *
*    RTE, FILE MANAGER, LIBRARY:                                            *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*    SPECIAL:                                                               *
*                                                                           *
*                                                                           *
*                                                                           *
*    APPLICATION: (NAME/Program, Subroutine, OR Function)                   *
*            /              /              /              /              /  *
*            /              /              /              /              /  *
*            /              /              /              /              /  *
*            /              /              /              /              /  *
*            /              /              /              /              /  *
*                                                                           *
* DATA FILES ACCESSED:                                                      *
*      ASCII XYZ                                                            *
*                                                                           *
*                                                                           *
*****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION   LEVEL: 4

ROUTINE NAME: MAPIO   AUTHOR: M. Paxton
8/3/79

REVISION CODE: DATE:

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:
[ ] PROGRAM   [X] SUBROUTINE   [ ] FUNCTION

GENERAL DESCRIPTION:

This routine controls the opening, reading, rewinding, and closing of the continuous data files built by CONCN.

ACCESSED BY:
CNTUR

LINKAGES:

Parametes passed thru the common block from PROGRAM CONCN

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
CLOSE (RTE)   RWNDF (RTE)
OPEN (RTE)
READF (RTE)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
*************************************************************************
*                                                                       *
* SEAMPLAN SOFTWARE DOCUMENTATION                   LEVEL:              *
*                                                                       *
* ROUTINE NAME: MLRS                                AUTHOR:             *
*                                                                       *
* REVISION CODE:                                    DATE:               *
*                                                                       *
* LOCATION / ACCESS PROCEDURE: & MLRS                                   *
*                                                                       *
* TYPE:                                                                 *
*    [X] PROGRAM       [ ] SUBROUTINE       [ ] FUNCTION                *
*                                                                       *
* GENERAL DESCRIPTION:                                                  *
*      Scraper fleet size for topsoil removal and respreading (FLUOR UTAH)
*      & dozer fleet size for overburden grading (CLAIM), as well as    *
*      revegetation estimates (CLAZM) are computed.                     *
*                                                                       *
* ACCESSED BY:                                                          *
*      LRS                                                              *
*                                                                       *
* LINKAGES:                                                             *
*      Land Reclamation simulation common                               *
*                                                                       *
* EXTERNAL REFERENCES:                                                  *
*                                                                       *
*    RTE, FILE MANAGER, LIBRARY:                                        *
*      CHS1Z        EXEC         RMPAR                                  *
*      CODE         IDSEG        SPOLN                                  *
*      ERASE        INITT                                               *
*                                                                       *
*    SPECIAL:                                                           *
*                                                                       *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)              *
*      NMLST / S                                                        *
*      RCLAM / P                                                        *
*                                                                       *
* DATA FILES ACCESSED:                                                  *
*      #VNLRS       #VTITL                                              *
*      #VNSEG                                                           *
*                                                                       *
*************************************************************************
```

```
******************************************************************************
*                                                                            *
* SEAMPLAN SOFTWARE DOCUMENTATION                    LEVEL: 3                *
*                                                                            *
* ROUTINE NAME: MODL                                 AUTHOR: Elm             *
*                                                                            *
* REVISION CODE:                                     DATE: 8/6/79            *
*                                                                            *
* LOCATION / ACCESS PROCEDURE: &MODL                                         *
*                                                                            *
* TYPE:                                                                      *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                       *
*                                                                            *
* GENERAL DESCRIPTION:                                                       *
*                                                                            *
*      MODL is called to select this proper analysis model directly or indirectly *
*                                                                            *
*      through the dynamic programming routine, PITOP.                       *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
* ACCESSED BY:                                                               *
*      FLEX        FTOL        WRITX        SUMR        FESBL                *
*                                                                            *
* LINKAGES:                                                                  *
*                                                                            *
*      Arguments - ZMOD, Model (MOD1 or MOD2) selection ZCODE, Model evaluation *
*                                                                            *
*      code                                                                  *
* EXTERNAL REFERENCES:                                                       *
*                                                                            *
*    RTE, FILE MANAGER, LIBRARY:                                             *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*    SPECIAL:                                                                *
*                                                                            *
*                                                                            *
*                                                                            *
*    APPLICATION: (NAME/Program, Subroutine, OR Function)                    *
*    DMOPS / S      PITOP / S      /      /      /                           *
*         /              /         /      /      /                           *
*         /              /         /      /      /                           *
*         /              /         /      /      /                           *
*         /              /         /      /      /                           *
*                                                                            *
* DATA FILES ACCESSED:                                                       *
*                                                                            *
*                                                                            *
*                                                                            *
******************************************************************************
```

```
*****************************************************************************
*                                                                           *
* SEAMPLAN SOFTWARE DOCUMENTATION                LEVEL:___3______________   *
*                                                                           *
* ROUTINE NAME:__MOD1__________                  AUTHOR:__Elm____________   *
*                                                                           *
* REVISION CODE:_______________                  DATE:_____8/16/79________  *
*                                                                           *
* LOCATION / ACCESS PROCEDURE:______&MOD1________________________________  *
*                                                                           *
* TYPE:                                                                     *
*    [ ] PROGRAM       [X] SUBROUTINE       [ ] FUNCTION                    *
*                                                                           *
* GENERAL DESCRIPTION:                                                      *
*                                                                           *
*       MOD1 is the single pan dragline model routine.  It evaluates dragline *
*  performance for a variety of 1 pass mining method assumming fixed coal   *
*  seam thickness and overburden depth.                                     *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
* ACCESSED BY:                                                              *
*    ___DMODS___  ___________  ___________  ___________  ___________        *
*                                                                           *
* LINKAGES:                                                                 *
*       COMMON - Flexible tolerance, M1COM, and T1COM blocks.               *
*       Arguments - ICODE; model evaluation code.                           *
*                                                                           *
*                                                                           *
* EXTERNAL REFERENCES:                                                      *
*                                                                           *
*    RTE, FILE MANAGER, LIBRARY:                                            *
*    ___________  ___________  ___________  ___________  ___________        *
*    ___________  ___________  ___________  ___________  ___________        *
*    ___________  ___________  ___________  ___________  ___________        *
*                                                                           *
*    SPECIAL:                                                               *
*    ___________  ___________  ___________  ___________  ___________        *
*    ___________  ___________  ___________  ___________  ___________        *
*                                                                           *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                  *
*    __INIT1__/_S  __TIME1__/_F  _________/_  _________/_  _________/_      *
*    _________/_   _________/_   _________/_  _________/_  _________/_      *
*    _________/_   _________/_   _________/_  _________/_  _________/_      *
*    _________/_   _________/_   _________/_  _________/_  _________/_      *
*    _________/_   _________/_   _________/_  _________/_  _________/_      *
*                                                                           *
* DATA FILES ACCESSED:                                                      *
*    ___________  ___________  ___________  ___________  ___________        *
*    ___________  ___________  ___________  ___________  ___________        *
*                                                                           *
*****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: MOD2 — AUTHOR: Elm

REVISION CODE: — DATE: 8/16/79

LOCATION / ACCESS PROCEDURE: &MOD2

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

MOD2 is the routine which implements the two pass dragline model. Several methods, including tandem operations are possible.

ACCESSED BY:
DMODS

LINKAGES:

COMMON - Flexible Tolerance (IFCOM), M1COM, M2COM and T2COM blocks.
Arguments - ICODE

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

AHAT /S — ENCOD /F — TIME /F — SPNCF /S — FYB23 /S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: MOVE — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & MOVE

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

MOVE controls the sequencing of the move operations in the dragline simulator. Although originally the hopper and dragline were moved in this implementation only dragline moves have been tested.

ACCESSED BY:
DRAG

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
ERASE (TCS) IDENT (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
MUSG /S WDAT /S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: MUSG AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & MUSG

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

MUSG handles common functions associated with dragline moves in the dragline simulator. It positions the bucket for a move, and simulates both X and Y direction steps.

ACCESSED BY:

MOVE

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

BCORD / S TPWR / S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: NH AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & MDUT1 file

TYPE:

[ ] PROGRAM [ ] SUBROUTINE [X] FUNCTION

GENERAL DESCRIPTION:

Retrieves the I, J, th element of the NH array through the MSU RTE III array segmentation scheme.

ACCESSED BY:

BCORD BFILL BHEEL BUCKT INTT
SFILL SPRED

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
**********************************************************************
*                                                                    *
* SEAMPLAN SOFTWARE DOCUMENTATION             LEVEL:_4______________ *
*                                                                    *
* ROUTINE NAME:_NINT__________                AUTHOR:_Elm___________ *
*                                                                    *
* REVISION CODE:_____________                 DATE:__8/25/79________ *
*                                                                    *
* LOCATION / ACCESS PROCEDURE:__&MDUT1______________________________ *
*                                                                    *
* TYPE:                                                              *
*    [ ] PROGRAM       [ ] SUBROUTINE       [X] FUNCTION             *
*                                                                    *
* GENERAL DESCRIPTION:                                               *
*                                                                    *
*        Nearest integer routine                                     *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
* ACCESSED BY:                                                       *
*   ___DUMP____  ___INTT____  __________  __________  __________     *
*                                                                    *
* LINKAGES:                                                          *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
* EXTERNAL REFERENCES:                                               *
*                                                                    *
*    RTE, FILE MANAGER, LIBRARY:                                     *
*   __________  __________  __________  __________  __________       *
*   __________  __________  __________  __________  __________       *
*   __________  __________  __________  __________  __________       *
*                                                                    *
*    SPECIAL:                                                        *
*   __________  __________  __________  __________  __________       *
*   __________  __________  __________  __________  __________       *
*                                                                    *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)           *
*   ________/_  ________/_  ________/_  ________/_  ________/_       *
*   ________/_  ________/_  ________/_  ________/_  ________/_       *
*   ________/_  ________/_  ________/_  ________/_  ________/_       *
*   ________/_  ________/_  ________/_  ________/_  ________/_       *
*   ________/_  ________/_  ________/_  ________/_  ________/_       *
*                                                                    *
* DATA FILES ACCESSED:                                               *
*   __________  __________  __________  __________  __________       *
*   __________  __________  __________  __________  __________       *
*                                                                    *
**********************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION   LEVEL: 4

ROUTINE NAME: NINT   AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & MDUT2

TYPE:

[ ] PROGRAM   [ ] SUBROUTINE   [X] FUNCTION

GENERAL DESCRIPTION:

Nearest integer routine

ACCESSED BY:

DUMP   INIT

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
*************************************************************************
*                                                                       *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:                   *
*                                                                       *
* ROUTINE NAME: NMPRX                          AUTHOR: Lehman           *
*                                                                       *
* REVISION CODE: 1.0                           DATE: 6/1/79             *
*                                                                       *
* LOCATION / ACCESS PROCEDURE: &NMPRX                                   *
*                                                                       *
* TYPE:                                                                 *
*    [X] PROGRAM      [ ] SUBROUTINE      [ ] FUNCTION                  *
*                                                                       *
* GENERAL DESCRIPTION:                                                  *
*                                                                       *
*      Constructs a square grid system over an area described by input X,Y,Z *
*                                                                       *
*      data points.                                                     *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
* ACCESSED BY:                                                          *
*      DENRV                                                            *
*                                                                       *
* LINKAGES:                                                             *
*                                                                       *
*      Uses RMPAR to determine user terminal logical unit.              *
*                                                                       *
*                                                                       *
* EXTERNAL REFERENCES:                                                  *
*                                                                       *
*    RTE, FILE MANAGER, LIBRARY:                                        *
*      RMPAR      CREAT      READF      WRITF      CLOSE                *
*      PURGE                                                            *
*                                                                       *
*                                                                       *
*    SPECIAL:                                                           *
*                                                                       *
*                                                                       *
*                                                                       *
*    APPLICATION: (NAME/Program, Subroutine, OR Function)               *
*      STMBS /P   STMBT /P   STMNU /P   STMBV /P   STMBZ /S             *
*           /          /          /          /          /               *
*           /          /          /          /          /               *
*           /          /          /          /          /               *
*           /          /          /          /          /               *
*                                                                       *
* DATA FILES ACCESSED:                                                  *
*      BINARY XYZ    GRID    $IWKFL                                     *
*                                                                       *
*                                                                       *
*************************************************************************
```

```
*************************************************************************
*                                                                       *
* SEAMPLAN SOFTWARE DOCUMENTATION                LEVEL:__4____________  *
*                                                                       *
* ROUTINE NAME:__OBR__________                   AUTHOR:__Elm_________  *
*                                                                       *
* REVISION CODE:______________                   DATE:____8-25-79_____  *
*                                                                       *
* LOCATION / ACCESS PROCEDURE:__& OBR_________________________________  *
*                                                                       *
* TYPE:                                                                 *
*    [ ] PROGRAM      [x] SUBROUTINE      [ ] FUNCTION                  *
*                                                                       *
* GENERAL DESCRIPTION:                                                  *
*                                                                       *
*      Controls sequencing of simulated work elements to perform        *
*      overburden to spoil, bench removal, and bench fill operations.   *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
* ACCESSED BY:                                                          *
*    ___OBS_____   ___BNR_____   ___BFL_____   ___________   ________   *
*                                                                       *
* LINKAGES:                                                             *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
* EXTERNAL REFERENCES:                                                  *
*                                                                       *
*    RTE, FILE MANAGER, LIBRARY:                                        *
*    _SPOLU (SYS)   ___________   ___________   ___________   ________  *
*    ___________   ___________   ___________   ___________   ________   *
*    ___________   ___________   ___________   ___________   ________   *
*                                                                       *
*    SPECIAL:                                                           *
*    ___________   ___________   ___________   ___________   ________   *
*    ___________   ___________   ___________   ___________   ________   *
*                                                                       *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)              *
*    __BCORD__/S   __BFILL__/S   __BHEEL__/S   __BPWR___/S   __DIG__/S  *
*    __DUMP___/S   __OBRI___/S   __SPILE__/S   __SWGA___/S   __TPWR_/S  *
*    _________/_   _________/_   _________/_   _________/_   _______/_  *
*    _________/_   _________/_   _________/_   _________/_   _______/_  *
*    _________/_   _________/_   _________/_   _________/_   _______/_  *
*                                                                       *
* DATA FILES ACCESSED:                                                  *
*    ___________   ___________   ___________   ___________   ________   *
*    ___________   ___________   ___________   ___________   ________   *
*                                                                       *
*************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: OBRF — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & OBRF

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Writes overburden removal totals to the line printer when appropriate.

ACCESSED BY:
OBS

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
ERASE (TCS) IDENT (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
AOBR /

DATA FILES ACCESSED:
LU6 - assignment varies

```
******************************************************************
*                                                                *
* SEAMPLAN SOFTWARE DOCUMENTATION          LEVEL:___4___________ *
*                                                                *
* ROUTINE NAME:__OBRI__________            AUTHOR:__Elm_________ *
*                                                                *
* REVISION CODE:_______________            DATE:____8-25-79_____ *
*                                                                *
* LOCATION / ACCESS PROCEDURE:__& OBRI__________________________ *
*                                                                *
* TYPE:                                                          *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION           *
*                                                                *
* GENERAL DESCRIPTION:                                           *
*                                                                *
*      OBRI initializes variables such as starting spoil height, cycle time,
*      etc. for each removal operation performed during the dragline
*      simulation.                                               *
*                                                                *
*                                                                *
*                                                                *
*                                                                *
*                                                                *
* ACCESSED BY:                                                   *
*    __OBR_____  __________  __________  __________  __________  *
*                                                                *
* LINKAGES:                                                      *
*                                                                *
*                                                                *
*                                                                *
*                                                                *
* EXTERNAL REFERENCES:                                           *
*                                                                *
*    RTE, FILE MANAGER, LIBRARY:                                 *
*    __________  __________  __________  __________  __________  *
*    __________  __________  __________  __________  __________  *
*    __________  __________  __________  __________  __________  *
*                                                                *
*    SPECIAL:                                                    *
*    __________  __________  __________  __________  __________  *
*    __________  __________  __________  __________  __________  *
*                                                                *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)       *
*    __RTHIA__/S ________/_  ________/_  ________/_  ________/_  *
*    ________/_  ________/_  ________/_  ________/_  ________/_  *
*    ________/_  ________/_  ________/_  ________/_  ________/_  *
*    ________/_  ________/_  ________/_  ________/_  ________/_  *
*    ________/_  ________/_  ________/_  ________/_  ________/_  *
*                                                                *
* DATA FILES ACCESSED:                                           *
*    __________  __________  __________  __________  __________  *
*    __________  __________  __________  __________  __________  *
*                                                                *
******************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: OBS — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & OBS

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Controls overburden removal operations, digging and dumping on the spoil pile. (Hopper dumps not implemented at MSU.)

ACCESSED BY:

DRAG

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

OBR/S OBRF/S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: OPDFM AUTHOR: Elm

REVISION CODE: DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & OPDFM

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Formats operation data table when a line printer listing is requested.

ACCESSED BY:

PROPD

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

CODE (RTE)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
*********************************************************************
*                                                                   *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL: 4             *
*                                                                   *
* ROUTINE NAME: OPDUP                          AUTHOR: Elm          *
*                                                                   *
* REVISION CODE:                               DATE: 8-25-79        *
*                                                                   *
* LOCATION / ACCESS PROCEDURE: & OPDUP                              *
*                                                                   *
* TYPE:                                                             *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION              *
*                                                                   *
* GENERAL DESCRIPTION:                                              *
*                                                                   *
*       Controls update and entry of operation data for the dragline *
*       simulator.                                                  *
*                                                                   *
*                                                                   *
* ACCESSED BY:                                                      *
*     OPSEQ                                                         *
*                                                                   *
* LINKAGES:                                                         *
*                                                                   *
*                                                                   *
* EXTERNAL REFERENCES:                                              *
*                                                                   *
*    RTE, FILE MANAGER, LIBRARY:                                    *
*     ERASE (TCS)    HOME (TCS)                                     *
*                                                                   *
*    SPECIAL:                                                       *
*                                                                   *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)          *
*     DSPOD / S                                                     *
*                                                                   *
* DATA FILES ACCESSED:                                              *
*                                                                   *
*********************************************************************
```

```
*****************************************************************************
*                                                                           *
* SEAMPLAN SOFTWARE DOCUMENTATION                LEVEL:                     *
*                                                                           *
* ROUTINE NAME: OPRAT                            AUTHOR: Conners            *
*                                                                           *
* REVISION CODE: 1.0                             DATE: 6/1/79               *
*                                                                           *
* LOCATION / ACCESS PROCEDURE: &OPRAT file                                  *
*                                                                           *
* TYPE:                                                                     *
*    [X] PROGRAM      [ ] SUBROUTINE      [ ] FUNCTION                      *
*                                                                           *
* GENERAL DESCRIPTION:                                                      *
*                                                                           *
*      Performs arithmetic operation on grid or X,Y,Z data.                 *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
* ACCESSED BY:                                                              *
*     DENRV                                                                 *
*                                                                           *
* LINKAGES:                                                                 *
*                                                                           *
*      Retrieves user terminal logical unit                                 *
*                                                                           *
*      using RMPAR                                                          *
* EXTERNAL REFERENCES:                                                      *
*                                                                           *
*    RTE, FILE MANAGER, LIBRARY:                                            *
*    RMPAR                                                                  *
*                                                                           *
*                                                                           *
*                                                                           *
*    SPECIAL:                                                               *
*    SPOLU                                                                  *
*                                                                           *
*                                                                           *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                  *
*         /            /            /            /            /             *
*         /            /            /            /            /             *
*         /            /            /            /            /             *
*         /            /            /            /            /             *
*         /            /            /            /            /             *
*                                                                           *
* DATA FILES ACCESSED:                                                      *
*                                                                           *
*                                                                           *
*                                                                           *
*****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: OPSEQ — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & OPSEQ

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This routine controls display and update of operation sequence and parameter data for the dragline simulator.

ACCESSED BY:
DATA

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
ERASE (TCS) HOUE (TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
DSPOD / S DSPSQ / S DSSAC / S OPDUP / S PROPD / S

DATA FILES ACCESSED:
Operation data file

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: OTLN — AUTHOR: M. Wagner

REVISION CODE: — DATE: 8/3/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This subroutine is designed to draw an outline of the map as it appears on the digitizing tablet.

ACCESSED BY:
all digitizing input routines

LINKAGES:
XMLL, YMLL, XMLR, YMLR, DX4, DY4 (Described within the program)

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
BELL (TCS) INITT (TCS)
DRWAB (TCS) MOVAB (TCS)
DRWRL (TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: ____________

ROUTINE NAME: OUTLN AUTHOR: Lehman

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &PTLOT :: 17

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Draws a polygon

ACCESSED BY:
PTLOT

LINKAGES:

Arguments include vertex coordinates and the number of vertix.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:
TCS

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: PFILE

AUTHOR: Elm

REVISION CODE:

DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & PFILE

TYPE:

[ ] PROGRAM [x] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Puts results in the dragline simulation SAVE file (specified by user to INAM) following each operation.

ACCESSED BY:

DRAG

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

CODE (RTE) SPOLU (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

"SAVE" file (user assigned name)

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: PINIT — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & PINIT

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Called by INTT to initialize the overburden grid array, NH.

ACCESSED BY:

INTT

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

PUTNH /S SFILL /S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: PITDN — AUTHOR: Elm

REVISION CODE: — DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &PITDN file / RV, SPAN

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

PITION is the 2nd level dragline design executive. It manages model evaluation, optimization and graphical display.

ACCESSED BY:
DLS2

LINKAGES:
Tektronix Common;
MOD1 - Common Block (single pass model)

MOD2 - Common block (2 pass model)

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
CHSIZ(TCS) ERASE(TCS) HOME(TCS) IOWAI(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
ANALY/S CNSTR/S DIAGR/S FLEX/S USER/S

DATA FILES ACCESSED: None

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: PITDP — AUTHOR: Elm

REVISION CODE: — DATE: 8/23/79

LOCATION / ACCESS PROCEDURE: &PITDP

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

PITDP controls the dynamic programming solution for multiple pit widths.

ACCESSED BY:
MODL

LINKAGES:

COMMON - IFCOM, M1COM, M2COM, DPCOM1, DPCOM2 blocks
ARGUMENTS - IMOD (dragline-model code)

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
EXEC(RTE) RMPAR (RTE)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
DMODS /S GETD /S RETRN /S

DATA FILES ACCESSED:
SCFIL

```
*************************************************************************
*                                                                       *
* SEAMPLAN SOFTWARE DOCUMENTATION                 LEVEL:                *
*                                                                       *
* ROUTINE NAME: PLTCN                             AUTHOR: Lehman        *
*                                                                       *
* REVISION CODE: 1.0                              DATE: 6/1/79          *
*                                                                       *
* LOCATION / ACCESS PROCEDURE:                    &CNTRG file           *
*                                                                       *
* TYPE:                                                                 *
*    [ ] PROGRAM      [X ] SUBROUTINE      [ ] FUNCTION                 *
*                                                                       *
* GENERAL DESCRIPTION:                                                  *
*                                                                       *
*      Contours an area represented by a grid of "Z" values.            *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
* ACCESSED BY:                                                          *
*    CNTRG                                                              *
*                                                                       *
* LINKAGES:                                                             *
*                                                                       *
*      Called by CNTRG; uses tektronix common block; other parameters passed *
*                                                                       *
*      as arguments.                                                    *
* EXTERNAL REFERENCES:                                                  *
*                                                                       *
*    RTE, FILE MANAGER, LIBRARY:                                        *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*    SPECIAL:                                                           *
*    TCS          DSP                                                   *
*                                                                       *
*                                                                       *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)              *
*    OUTLN  /S         /          /          /          /               *
*           /          /          /          /          /               *
*           /          /          /          /          /               *
*           /          /          /          /          /               *
*           /          /          /          /          /               *
*                                                                       *
* DATA FILES ACCESSED:                                                  *
*                                                                       *
*                                                                       *
*                                                                       *
*************************************************************************
```

```
*************************************************************************
*                                                                       *
* SEAMPLAN SOFTWARE DOCUMENTATION               LEVEL:                  *
*                                                                       *
* ROUTINE NAME: PLT3D                           AUTHOR: Lehman          *
*                                                                       *
* REVISION CODE: 1.0                            DATE: 6/1/79            *
*                                                                       *
* LOCATION / ACCESS PROCEDURE: &PLT3D file                              *
*                                                                       *
* TYPE:                                                                 *
*     [ ] PROGRAM       [X] SUBROUTINE       [ ] FUNCTION               *
*                                                                       *
* GENERAL DESCRIPTION:                                                  *
*                                                                       *
*       Produces three dimensional plots with rotations and hidden line *
*                                                                       *
*       removal.                                                        *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
* ACCESSED BY:                                                          *
*     TRD        CS3DD                                                  *
*                                                                       *
* LINKAGES:                                                             *
*                                                                       *
*       Called with viewing postion arguments.                          *
*                                                                       *
*                                                                       *
* EXTERNAL REFERENCES:                                                  *
*                                                                       *
*    RTE, FILE MANAGER, LIBRARY:                                        *
*                                                                       *
*                                                                       *
*                                                                       *
*                                                                       *
*    SPECIAL:                                                           *
*                                                                       *
*                                                                       *
*                                                                       *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)              *
*          /          /          /          /          /                *
*          /          /          /          /          /                *
*          /          /          /          /          /                *
*          /          /          /          /          /                *
*          /          /          /          /          /                *
*                                                                       *
* DATA FILES ACCESSED:                                                  *
*                                                                       *
*                                                                       *
*                                                                       *
*************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: PNTDR — AUTHOR: M. Wagner

REVISION CODE: — DATE: 8/2/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This program is designed to draw the map created by PTDTA

ACCESSED BY:
PTDTA

LINKAGES:

IPRM, ITEK, COMMON BLOCK from PROGRAM PTDTA

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD (TCS)	CLDFL (%DAFMP)	DFNEL (%DAFMP)	DRWRL (TCS)	FINTT (TCS)
BMLOC (SYS)	CLOSE (RTE)	DRAWA (TCS)	ERASE (TCS)	HOME (TCS)
CHSIZ (TCS)	DASHA (TCS)	DREAD (%DAFMP)	EXEC (RTE)	INITT (TCS)
IOWAT (SYS)	MOVRL (TCS)	READF (RTE)	MOVAB (TCS)	OPEN (RTE)
	RMPAR (SYS)	MOVEA (TCS)	POSNT (RTE)	SWNDO (TCS)
TBINT (%TABLT)	VCRSR (TCS)	VWNDO (TCS)		

APPLICATION: (NAME/Program, Subroutine, OR Function)
DRAWM /S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: PRNPD

AUTHOR: Elm

REVISION CODE:

DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & PRNPD

TYPE:

[ ] PROGRAM [x] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Prints the dragline simulation parameter data on the line printer as part of the parameter data update/display operation.

ACCESSED BY:

UPSET

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

CODE (RTE) DATE (SYS) IDENT (SYS) SPOLU (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: PROPD — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & PROPD

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

PROPD prints dragline simulation operation data on the printer.

ACCESSED BY:
OPSEQ

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
CODE (RTE) DATE (SYS) IDENT (SYS) SPOLU (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
OPDFM /

DATA FILES ACCESSED:

```
*****************************************************************
*                                                               *
* SEAMPLAN SOFTWARE DOCUMENTATION          LEVEL: 4             *
*                                                               *
* ROUTINE NAME: PTDTA                      AUTHOR: M. Wagner    *
*                                                               *
* REVISION CODE:                           DATE: 8/2/79         *
*                                                               *
* LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW            *
*                                                               *
* TYPE:                                                         *
*    [X] PROGRAM      [ ] SUBROUTINE      [ ] FUNCTION          *
*                                                               *
* GENERAL DESCRIPTION:                                          *
*                                                               *
*    This Program is designed to input point data from the digitizing tablet *
*                                                               *
* ACCESSED BY:                                                  *
*    DGINT                                                      *
*                                                               *
* LINKAGES:                                                     *
*                                                               *
*    IPRM                                                       *
*                                                               *
* EXTERNAL REFERENCES:                                          *
*                                                               *
*    RTE, FILE MANAGER, LIBRARY:                                *
*    ANMOD (TCS)   CHSIZ (TCS)     CREATE (RTE)  DREND (%DAFMP)  EXEC (RTE)    *
*    BELL (TCS)    CLDFL(%DAFMP)   DFNFL(%DAFMP) DRWRL (TCS)     FINTT (TCS)   *
*    BMLOC (SYS)   CLOSE (RTE)     DRAWA (TCS)   ERASE (TCS)     FLOAT (TCS)   *
*    HOME (TCS)    MOVAB (TCS)     NEWPG (TCS)   IDSEG (SYS)     MOVEA (TCS)   *
*                  ONEPT (%TABLT)  INITT (TCS)   MOVRL (TCS)     OPEN (RTE)    *
*    POSNT (RTE)   SWNDO (TCS)     VWNDO (TCS)   PURGE (RTE)     TBINT(%TABLT) *
*    WRITE (RTE)   READF (RTE)     TINPT (SYS)                                 *
*                                                               *
*    APPLICATION: (NAME/Program, Subroutine, OR Function)       *
*    PNTDR / P                                                  *
*    OTLN / S                                                   *
*    SQUAR / S                                                  *
*    SCALE / S                                                  *
*                                                               *
* DATA FILES ACCESSED:                                          *
*                                                               *
*****************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL:

ROUTINE NAME: PTFLS

AUTHOR: Lehman

REVISION CODE: 1.0

DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &PTFLS :: 17

TYPE:

[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Searches grid files for pit layout operations.

ACCESSED BY:

PTLOT

LINKAGES:

Uses PTOPO common; swapped program.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

RMPAR EXEC

SPECIAL:

SPOLU

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

GRID

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL:

ROUTINE NAME: PTLOT AUTHOR: Lehman

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &PTLOT ::17

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Performs pit layout operations on contour map.

ACCESSED BY:
PTOPO

LINKAGES:

Uses PTOPO common

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
RMPAR EXEC

SPECIAL:
TCS SPOLU DAFMP

APPLICATION: (NAME/Program, Subroutine, OR Function)
REDRW/S LINE/S CRAMR/S DRNG/S
CROSS/S PTFLS/P OUTLN/S

DATA FILES ACCESSED:
#MINE GRID

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL:

ROUTINE NAME: PTOPO

AUTHOR: Lehman

REVISION CODE: 1.0

DATE: 6/1/79

LOCATION / ACCESS PROCEDURE:

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Prepares data and initializes parameters for contour displays of gridded data. Swaps in pit layout routines.

ACCESSED BY:
ADM

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
RMPAR EXEC

SPECIAL:
SPOLU DAFMP TCS DSP

APPLICATION: (NAME/Program, Subroutine, OR Function)
ZOOM/S BOX/S GRDIN/P

DATA FILES ACCESSED:
GRID #MINE

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: PUTNH — AUTHOR: Elm

REVISION CODE: — DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & MDUT1 file

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Inserts the I, J th element into the NH array through the MSU RTE III array segmentation scheme.

ACCESSED BY:
BHEEL BUCKT INIT PINIT SFILL
SPRED

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
****************************************************************************
*                                                                          *
* SEAMPLAN SOFTWARE DOCUMENTATION                    LEVEL: 2              *
*                                                                          *
* ROUTINE NAME: QBE                                  AUTHOR: Elm           *
*                                                                          *
* REVISION CODE:                                     DATE: 7/19/79         *
*                                                                          *
* LOCATION / ACCESS PROCEDURE: &QBE file (RU,ADM or RV, SPLAN)             *
*                                                                          *
* TYPE:                                                                    *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                     *
*                                                                          *
* GENERAL DESCRIPTION:                                                     *
*                                                                          *
*       QBE Common Block                                                   *
*                                                                          *
*       Arguments: LFEC, LFLP logical units                                *
*                                                                          *
*       LOGQB, LOGEC Model selection plays.                                *
*                                                                          *
*                                                                          *
* ACCESSED BY:                                                             *
*     CODE(RTE)                                                            *
*                                                                          *
* LINKAGES:                                                                *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
* EXTERNAL REFERENCES:                                                     *
*                                                                          *
*    RTE, FILE MANAGER, LIBRARY:                                           *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*    SPECIAL:                                                              *
*                                                                          *
*                                                                          *
*                                                                          *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                 *
*          /              /              /              /              /   *
*          /              /              /              /              /   *
*          /              /              /              /              /   *
*          /              /              /              /              /   *
*          /              /              /              /              /   *
*                                                                          *
* DATA FILES ACCESSED:                                                     *
*                                                                          *
*                                                                          *
*                                                                          *
****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: ________

ROUTINE NAME: RAN AUTHOR: ________

REVISION CODE: ________ DATE: ________

LOCATION / ACCESS PROCEDURE: & MDUTZ

TYPE:

[ ] PROGRAM [ ] SUBROUTINE [X] FUNCTION

GENERAL DESCRIPTION:

Returns a random number

ACCESSED BY:

SPRED

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL:

ROUTINE NAME: RCLAM

AUTHOR: Orville Green

REVISION CODE:

DATE: 6-15-79

LOCATION / ACCESS PROCEDURE: & RCLAM

TYPE:

[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Determine level 2 reclamation regrade parameters and planting estimates - scheduling executive for CLAIM subsystem

ACCESSED BY:

MLRS

LINKAGES:

CSSE COMMON description (MLRS)

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

RMPAR EXEC

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

GETID / P	LED /P	IRSMR / S	TCON2 /S	/
SRED / P	LEV /P	DSPSP / S	TCON4 /S	/
EIFD / P	FEASI /P	CTPMR / S	SWAPC /S	/
EIAD / P	TECON /P	LUOS / S	TFCD /S	/
/	OPUSE /P	TCON1 / S	/	/

DATA FILES ACCESSED:

```
************************************************************************
*                                                                      *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:                  *
*                                                                      *
* ROUTINE NAME: RDGRD                          AUTHOR: Conners         *
*                                                                      *
* REVISION CODE: 1.0                           DATE:   6/1/79          *
*                                                                      *
* LOCATION / ACCESS PROCEDURE: & CS3DD                                 *
*                                                                      *
* TYPE:                                                                *
*    [ ] PROGRAM        [X] SUBROUTINE        [ ] FUNCTION             *
*                                                                      *
* GENERAL DESCRIPTION:                                                 *
*                                                                      *
*       Reads grid data file and stores in common block.               *
*                                                                      *
*                                                                      *
*                                                                      *
*                                                                      *
*                                                                      *
*                                                                      *
*                                                                      *
* ACCESSED BY:                                                         *
*    CS3DD                                                             *
*                                                                      *
* LINKAGES:                                                            *
*                                                                      *
*                                                                      *
*                                                                      *
*                                                                      *
* EXTERNAL REFERENCES:                                                 *
*                                                                      *
*    RTE, FILE MANAGER, LIBRARY:                                       *
*    EXEC                                                              *
*                                                                      *
*                                                                      *
*                                                                      *
*    SPECIAL:                                                          *
*    SPOLU                                                             *
*                                                                      *
*                                                                      *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)             *
*        /            /            /            /            /         *
*        /            /            /            /            /         *
*        /            /            /            /            /         *
*        /            /            /            /            /         *
*        /            /            /            /            /         *
*                                                                      *
* DATA FILES ACCESSED:                                                 *
*    GRID                                                              *
*                                                                      *
*                                                                      *
************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: ______

ROUTINE NAME: REDRW AUTHOR: Lehman

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &PTLOT :: 17

TYPE:

[ ] PROGRAM [x] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Redraws thecurrent pit layput as returned by production analysis.

ACCESSED BY:

PTLOT

LINKAGES:

Uses PTOPO common

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

TCS DAFMP

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: RETRN — AUTHOR: Elm

REVISION CODE: — DATE: 8/23/79

LOCATION / ACCESS PROCEDURE: &RETRN

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

RETRN evaluates all decisions for all slates for a simple stage and saves the best decision during the backward stepping in D.P.

ACCESSED BY:
PITDP

LINKAGES:

COMMON - IFCOM, M1COM, M2COM, DPCOM1, DPCOM2,
ARGUMENTS - IMOD

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
DMODS /S   GETD /S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: RNDDR — AUTHOR: M. Wagner

REVISION CODE: — DATE: 8/2/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

The Purpose of this program is to draw the files created by RNDIS

ACCESSED BY:
RNDIS

LINKAGES:

IPRM, ITEK, COMMON BLOCK from Program RNDDR.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD (TCS)	CHSIZ (TCS)	FLOAT (TCS)	MOVAB (TCS)	RMPAR (SYS)
BELL (TCS)	DRWAB (TCS)	HOME (TCS)	MOVEA (TCS)	SPOLU (SYS)
BMLOC (SYS)	EXEC (RTE)	INITT (TCS)	NEWPG (TCS)	TINPT (SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
DRAWM /S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: RNDIS — AUTHOR: M. Wagner

REVISION CODE: — DATE: 8/2/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:

[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This program is designed to digitize discrete data.

ACCESSED BY:

DGINT

LINKAGES:

IPRM

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD (TCS)	CHSIZ (TCS)	EXEC (RTE)	HOME (TCS)	MOVAB (TCS)
BELL (TCS)	DRWAB (TCS)	EINTT(TCS)	IDSEG(SYS)	MOVRL (TCS)
BMLOC (SYS)	DRWRL (TCS)	FLOAT(TCS)	INTT (TCS)	NEWPC (TCS)
ONEPT (%TABLT)	SPOLU (SYS)	TBINT(%TABLT)		

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

RNDDR / P

OTLN / S

SCALE / S

SQUAR / S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL:

ROUTINE NAME: RNITZ — AUTHOR: Elm

REVISION CODE: — DATE: 7/16/79

LOCATION / ACCESS PROCEDURE: &RNITZ

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Preforms file based on initialization of MINE parameters

(ADM Common block GVNADM)

ACCESSED BY:

ADM(ADM1)

LINKAGES:

GVNADM Common Bolock (General Mine parameters)

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

CODE(RTE) SPOLU(LIB)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

#VNADM

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: ROTAT — AUTHOR: Elm

REVISION CODE: — DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &ROTAT

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

ROTAT Rotates a point and draws or moves to it, and optionally places a character at the end of the draw.

ACCESSED BY:
DRWPL HUB

LINKAGES:

COMMON - DIAGR COMMON block (others for position)

Arguments - ZCHAR, XBGN, YBGN, OFF1, OFF2

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
ANMOD(TCS) DRAWA(TCS) GETLU(DSP) MOVEA(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
****************************************************************************
*                                                                          *
* SEAMPLAN SOFTWARE DOCUMENTATION                  LEVEL:                  *
*                                                                          *
* ROUTINE NAME: RPT                                AUTHOR: Elm             *
*                                                                          *
* REVISION CODE:                                   DATE: 7/16/79           *
*                                                                          *
* LOCATION / ACCESS PROCEDURE: &RPT                                        *
*                                                                          *
* TYPE:                                                                    *
*    [ ] PROGRAM      [x] SUBROUTINE      [ ] FUNCTION                     *
*                                                                          *
* GENERAL DESCRIPTION:                                                     *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
* ACCESSED BY:                                                             *
*    ADM(RPTX)                                                             *
*                                                                          *
* LINKAGES:                                                                *
*                                                                          *
*    Arguments XDB, XDT, XRT, XTB, XTT, All ADM Common Blocks              *
*                                                                          *
*                                                                          *
* EXTERNAL REFERENCES: None                                                *
*                                                                          *
*    RTE, FILE MANAGER, LIBRARY:                                           *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*    SPECIAL:                                                              *
*                                                                          *
*                                                                          *
*                                                                          *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                 *
*    /          /          /          /          /                         *
*    /          /          /          /          /                         *
*    /          /          /          /          /                         *
*    /          /          /          /          /                         *
*    /          /          /          /          /                         *
*                                                                          *
* DATA FILES ACCESSED: None                                                *
*                                                                          *
*                                                                          *
*                                                                          *
****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: RSPON — AUTHOR: Elm

REVISION CODE: — DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &RSPON

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

RSPON decodes constraint numbers into messages to the user regarding feasibility of a design drawn on the screen.

ACCESSED BY:
CNSTR

LINKAGES: COMMON - Tektroix, 1 pass (MOD1), 2 pass (MOD2) common blocks.

Arguments - IAREA, INDEX infeasibility claaification code and message index.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
CHSLZ(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: RTHTA

AUTHOR: Elm

REVISION CODE:

DATE: 8-25-79

LOCATION / ACCESS PROCEDURE: & RTHTA

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Calculates the radial distance and angle to a desired point for several of the dragline simulator routines.

ACCESSED BY:

BCORD SWGA BHEEL BFILL BPWR
OBRI

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
*********************************************************************
*                                                                   *
* SEAMPLAN SOFTWARE DOCUMENTATION           LEVEL: 4                *
*                                                                   *
* ROUTINE NAME: RTRVL                       AUTHOR: W. Larson       *
*                                                                   *
* REVISION CODE:                            DATE: 5/79              *
*                                                                   *
* LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW                *
*                                                                   *
* TYPE:                                                             *
*    [X] PROGRAM      [ ] SUBROUTINE      [ ] FUNCTION              *
*                                                                   *
* GENERAL DESCRIPTION:                                              *
*                                                                   *
*     Program to retrieve data from the keyed access files for the core hole *
*     analysis option of Data Entry and Review.                     *
*                                                                   *
*                                                                   *
*                                                                   *
*                                                                   *
*                                                                   *
*                                                                   *
* ACCESSED BY:                                                      *
*     XSEC                                                          *
*                                                                   *
* LINKAGES:                                                         *
*                                                                   *
*     ITEK, COMMON BLOCK from Program XSEC                          *
*                                                                   *
*                                                                   *
* EXTERNAL REFERENCES:                                              *
*                                                                   *
*    RTE, FILE MANAGER, LIBRARY:                                    *
*    CLOSK (%KAFMP)  RMPAR (SYS)                                    *
*    EXEC(RTE)       RTRV(%KAFMP)                                   *
*    OPENK(%KAFMP)                                                  *
*                                                                   *
*    SPECIAL:                                                       *
*                                                                   *
*                                                                   *
*                                                                   *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)          *
*      /              /              /              /              /  *
*      /              /              /              /              /  *
*      /              /              /              /              /  *
*      /              /              /              /              /  *
*      /              /              /              /              /  *
*                                                                   *
* DATA FILES ACCESSED:                                              *
*                                                                   *
*                                                                   *
*                                                                   *
*********************************************************************
```

```
****************************************************************************
*                                                                          *
* SEAMPLAN SOFTWARE DOCUMENTATION               LEVEL: ____4____________   *
*                                                                          *
* ROUTINE NAME: __SCALE________                 AUTHOR: ___M. Wagner_____  *
*                                                                          *
* REVISION CODE: ______________                 DATE: ______8/3/79_______  *
*                                                                          *
* LOCATION / ACCESS PROCEDURE: ___DATA ENTRY AND REVIEW__________________  *
*                                                                          *
* TYPE:                                                                    *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                     *
*                                                                          *
* GENERAL DESCRIPTION:                                                     *
*                                                                          *
*       This subroutine is designed to scale points from digitizing tablet *
*      coordinates to geographical coordinates                             *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
* ACCESSED BY:                                                             *
*    __digitizing input routines_  ________  ________  ________            *
*                                                                          *
* LINKAGES:                                                                *
*      XMIN, YMIN, XMAX, YMAX, ROTAN, XMLL, YMLL, IX, IY, SCL,X,Y, IERR    *
*      (as desribed within the subroutine)                                 *
*                                                                          *
*                                                                          *
* EXTERNAL REFERENCES:                                                     *
*                                                                          *
*    RTE, FILE MANAGER, LIBRARY:                                           *
*    __none____  ________  ________  ________  ________                    *
*    ________    ________  ________  ________  ________                    *
*    ________    ________  ________  ________  ________                    *
*                                                                          *
*    SPECIAL:                                                              *
*    ________    ________  ________  ________  ________                    *
*    ________    ________  ________  ________  ________                    *
*                                                                          *
*    APPLICATION: (NAME/Program, Subroutine, OR Function)                  *
*    ______/_    ______/_  ______/_  ______/_  ______/_                    *
*    ______/_    ______/_  ______/_  ______/_  ______/_                    *
*    ______/_    ______/_  ______/_  ______/_  ______/_                    *
*    ______/_    ______/_  ______/_  ______/_  ______/_                    *
*    ______/_    ______/_  ______/_  ______/_  ______/_                    *
*                                                                          *
* DATA FILES ACCESSED:                                                     *
*    ________    ________  ________  ________  ________                    *
*    ________    ________  ________  ________  ________                    *
*                                                                          *
****************************************************************************
```

```
****************************************************************************
*                                                                          *
* SEAMPLAN SOFTWARE DOCUMENTATION                  LEVEL: 4                *
*                                                                          *
* ROUTINE NAME: SFILL                              AUTHOR: Elm             *
*                                                                          *
* REVISION CODE:______________                     DATE: 8-25-79           *
*                                                                          *
* LOCATION / ACCESS PROCEDURE: & SFILL                                     *
*                                                                          *
* TYPE:                                                                    *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION                     *
*                                                                          *
* GENERAL DESCRIPTION:                                                     *
*                                                                          *
*      Called by PINIT to shape the overburden grid (done in 7 calls).     *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
* ACCESSED BY:                                                             *
*    __PINIT___   __________   __________   __________   __________        *
*                                                                          *
* LINKAGES:                                                                *
*                                                                          *
*                                                                          *
*                                                                          *
*                                                                          *
* EXTERNAL REFERENCES:                                                     *
*                                                                          *
*    RTE, FILE MANAGER, LIBRARY:                                           *
*    __________   __________   __________   __________   __________        *
*    __________   __________   __________   __________   __________        *
*    __________   __________   __________   __________   __________        *
*                                                                          *
*    SPECIAL:                                                              *
*    __________   __________   __________   __________   __________        *
*    __________   __________   __________   __________   __________        *
*                                                                          *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                 *
*    __NH____/E   __PUTNH_/S   ________/_   ________/_   ________/_        *
*    ________/_   ________/_   ________/_   ________/_   ________/_        *
*    ________/_   ________/_   ________/_   ________/_   ________/_        *
*    ________/_   ________/_   ________/_   ________/_   ________/_        *
*    ________/_   ________/_   ________/_   ________/_   ________/_        *
*                                                                          *
* DATA FILES ACCESSED:                                                     *
*    __________   __________   __________   __________   __________        *
*    __________   __________   __________   __________   __________        *
*                                                                          *
****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 3

ROUTINE NAME: SHADE AUTHOR: ELm

REVISION CODE: DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &SHADE file

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Shades spoil slopes by drawing

ACCESSED BY:
DRWPL

LINKAGES:

COMMON - DIAGR 6 Code (others for position)

Arguments X1, Y1, XDIREL, YDIREC, RNDEX, X DIST; starting spoil pile location and shading qeometry value.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
DRAWR(TCS) MOVEA (TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: SHGT — AUTHOR: Elm

REVISION CODE: — DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &SHGT

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Calculates the height of G spoil pile segment for the dragline simulator

ACCESSED BY:
SPILE INIT

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

```
*******************************************************************
*                                                                 *
* SEAMPLAN SOFTWARE DOCUMENTATION          LEVEL: 4               *
*                                                                 *
* ROUTINE NAME: SORT                       AUTHOR: W. Larson      *
*                                                                 *
* REVISION CODE:                           DATE: 5/79             *
*                                                                 *
* LOCATION / ACCESS PROCEDURE:    DATA ENTRY AND REVIEW           *
*                                                                 *
* TYPE:                                                           *
*    [ ] PROGRAM      [X] SUBROUTINE      [ ] FUNCTION            *
*                                                                 *
* GENERAL DESCRIPTION:                                            *
*                                                                 *
*     Finds the Maximum and minimum for an array.                 *
*                                                                 *
*                                                                 *
*                                                                 *
*                                                                 *
*                                                                 *
*                                                                 *
* ACCESSED BY:                                                    *
*    GREF                                                         *
*                                                                 *
* LINKAGES:                                                       *
*                                                                 *
*     VAL, AMAX,AMIN,N                                            *
*                                                                 *
*                                                                 *
* EXTERNAL REFERENCES:                                            *
*                                                                 *
*    RTE, FILE MANAGER, LIBRARY:                                  *
*                                                                 *
*                                                                 *
*                                                                 *
*                                                                 *
*    SPECIAL:                                                     *
*                                                                 *
*                                                                 *
*                                                                 *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)        *
*          /           /           /           /           /      *
*          /           /           /           /           /      *
*          /           /           /           /           /      *
*          /           /           /           /           /      *
*          /           /           /           /           /      *
*                                                                 *
* DATA FILES ACCESSED:                                            *
*                                                                 *
*                                                                 *
*                                                                 *
*******************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: SPCNF — AUTHOR: Elm

REVISION CODE: — DATE: 8/16/79

LOCATION / ACCESS PROCEDURE: SPCNF

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Solves for rehandle area requirements parameter DELC.

ACCESSED BY:
MOD2

LINKAGES:

COMMON - IFCOM, M1COM, M2COM, T2COM blocks
Arguments - AREA, AHATT, WPRIM

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
ECNOD / F

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: SPEED

AUTHOR: Elm

REVISION CODE:

DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &SPEED

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Calculates time required for hoist, drag, or swing motions for a given portion of the bucket trajectory.

ACCESSED BY:

TPWR

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: SPILE

AUTHOR: Elm

REVISION CODE:

DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: & SPILE

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

ontrols spoil pile buildup during dragline simulation.

ACCESSED BY:

OBR

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

SHGT/S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: SPRED AUTHOR: Elm

REVISION CODE: DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &SPRED

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

SPRED, originally named SPREAD, distributes material dumped in a bench fill operation or graded while bucket heeling.

ACCESSED BY:
BHEEL BFILL

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
NH /F PUTNH /S RAN /F

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: SQUAR — AUTHOR: M. Wagner

REVISION CODE: — DATE: 8/3/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This subroutine is used by all digitizing input routines. It is used to find the positioning of the map on the digitizong tablet.

ACCESSED BY:
All digitizing input routines

LINKAGES:

XMLL, YMILL, XMLR, YMLR, DX4, DYM, DXM, DYM, ROANG, IC
(as described within the subroutine)

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD (TCS)	INITT (TCS)	ONEPT (%TABLT)
BELL (TCS)	MOVAB (TCS)	TBINT (%TABLT)
BMLOC (SYS)	NEWPC (TCS)	

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
OTLN /S

DATA FILES ACCESSED:

```
*****************************************************************************
*                                                                           *
* SEAMPLAN SOFTWARE DOCUMENTATION                   LEVEL:                  *
*                                                                           *
* ROUTINE NAME: STUP3                               AUTHOR: Lehman          *
*                                                                           *
* REVISION CODE: 1.0                                DATE: 6/1/79            *
*                                                                           *
* LOCATION / ACCESS PROCEDURE: &STUP3 file                                  *
*                                                                           *
* TYPE:                                                                     *
*    [X] PROGRAM        [ ] SUBROUTINE        [ ] FUNCTION                  *
*                                                                           *
* GENERAL DESCRIPTION:                                                      *
*                                                                           *
*       Gets viewing parameters for three dimensional displays.             *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
* ACCESSED BY:                                                              *
*    TRD                                                                    *
*                                                                           *
* LINKAGES:                                                                 *
*                                                                           *
*       Retrieves TRD common block from disc.                               *
*                                                                           *
*                                                                           *
* EXTERNAL REFERENCES:                                                      *
*                                                                           *
*    RTE, FILE MANAGER, LIBRARY:                                            *
*    RMPAR          EXEC                                                    *
*                                                                           *
*                                                                           *
*                                                                           *
*    SPECIAL:                                                               *
*                                                                           *
*                                                                           *
*                                                                           *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                  *
*         /              /              /              /              /     *
*         /              /              /              /              /     *
*         /              /              /              /              /     *
*         /              /              /              /              /     *
*         /              /              /              /              /     *
*                                                                           *
* DATA FILES ACCESSED:                                                      *
*                                                                           *
*                                                                           *
*                                                                           *
*****************************************************************************
```

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: SVOL

AUTHOR: Elm

REVISION CODE:

DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &SVOL

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Calculate the volume contained in a spoil pile segment (5-99).

ACCESSED BY:

INTT

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 4

ROUTINE NAME: SWCON AUTHOR: M. Wagner

REVISION CODE: DATE: 8/3/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This routine is designed to SWAP in the drawing routine (CONDR) for continuous data.

ACCESSED BY:

CONCN

LINKAGES:

IPRM, COMMON BLOCK from PROGRAM CONCN.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

EXEC (RTE)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: SWGA — AUTHOR: ELM

REVISION CODE: — DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &SWGA

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Moves the bucket from bucket loading position to dumping position and vice-versa during dragline simulation of overburden removal. Updates swing angle histogram.

ACCESSED BY:
OBR

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)
BCORD/S RTHTA/S TPWR/S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: SWTCH — AUTHOR: Elm

REVISION CODE: — DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &SWTCH

TYPE:
[ ] PROGRAM [x] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Routine coded at MSU to interface the dragline simulator with SEAMPLAN. Converts ADM variables to MD equivalents.

ACCESSED BY:
EXDRG

LINKAGES:

COMMON _Blank; M.D., ADM labeled blocks
Arguments - none.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: SYMED — AUTHOR: M. Wagner

REVISION CODE: — DATE: 8/3/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This program is designed to create and/or edit a symbol table to be used for digitizing point data.

ACCESSED BY:
PTDTA

LINKAGES:

IPRM, ITEK, COMMON BLOCK from Program (PTDTA)

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD (TCS)	CLDFL (%DAFMP)	DREAD (%DAFMP)	DWRIT (%DAFMP)	INITT (TCS)
BELL (TCS)	DFNFL (%DAFMP)	DRWAB (TCS)	EXEC (RTE)	IOWAT (SYS)
CHSIZ (TCS)	DRAWA (TCS)	DSHAB (TCS)	HOME (TCS)	MOVAB (TCS)
MOVEA (TCS)	RMPAR (SYS)	TINPT (SYS)	NEWPG (TCS)	SWNDO (TCS)
	VWNDO (TCS)	ONEPT (%TABLT)	TBINT (%TABLT)	

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

SCALE / S

SQUAR / S

DATA FILES ACCESSED:

```
*****************************************************************************
*                                                                           *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:___3_____________      *
*                                                                           *
* ROUTINE NAME:___TIME_________                AUTHOR:__Elm____________     *
*                                                                           *
* REVISION CODE:_______________                DATE:____8/16/79________     *
*                                                                           *
* LOCATION / ACCESS PROCEDURE:______&TIME_________________________________  *
*                                                                           *
* TYPE:                                                                     *
*    [ ] PROGRAM       [ ] SUBROUTINE      [X] FUNCTION                     *
*                                                                           *
* GENERAL DESCRIPTION:                                                      *
*                                                                           *
*      TIME evaluates the time for a two-pass stripping operation to uncover *
*  the design area.                                                         *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
* ACCESSED BY:                                                              *
*    __MOD2_____  ___________  ___________  ___________  ___________        *
*                                                                           *
* LINKAGES:                                                                 *
*       COMMON - IFCOM, M1COM, M2COM, T2COM blocks                          *
*       Arguments - W12, W22, TIME1, TIME2, TDIG1, TDIG2, TWALK1, TWALK2.   *
*                                                                           *
*                                                                           *
* EXTERNAL REFERENCES:                                                      *
*                                                                           *
*    RTE, FILE MANAGER, LIBRARY:                                            *
*    ___________  ___________  ___________  ___________  ___________        *
*    ___________  ___________  ___________  ___________  ___________        *
*    ___________  ___________  ___________  ___________  ___________        *
*                                                                           *
*    SPECIAL:                                                               *
*    ___________  ___________  ___________  ___________  ___________        *
*    ___________  ___________  ___________  ___________  ___________        *
*                                                                           *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                  *
*    __EYB23__/F  _________/_  _________/_  _________/_  _________/_        *
*    _________/_  _________/_  _________/_  _________/_  _________/_        *
*    _________/_  _________/_  _________/_  _________/_  _________/_        *
*    _________/_  _________/_  _________/_  _________/_  _________/_        *
*    _________/_  _________/_  _________/_  _________/_  _________/_        *
*                                                                           *
* DATA FILES ACCESSED:                                                      *
*    ___________  ___________  ___________  ___________  ___________        *
*    ___________  ___________  ___________  ___________  ___________        *
*                                                                           *
*****************************************************************************
```

```
*****************************************************************************
*                                                                           *
* SEAMPLAN SOFTWARE DOCUMENTATION              LEVEL:___3_______________    *
*                                                                           *
* ROUTINE NAME:__TIME1_________                AUTHOR:__Elm_____________    *
*                                                                           *
* REVISION CODE:_______________                DATE:____8/16/79_________    *
*                                                                           *
* LOCATION / ACCESS PROCEDURE:______&TIME1______________________________    *
*                                                                           *
* TYPE:                                                                     *
*    [ ] PROGRAM      [ ] SUBROUTINE      [X] FUNCTION                      *
*                                                                           *
* GENERAL DESCRIPTION:                                                      *
*                                                                           *
*       TIME1 is called to evaluate the time to strip the designated        *
*  design area.                                                             *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
* ACCESSED BY:                                                              *
*  MOD1__________  ____________  ____________  ____________  ____________   *
*                                                                           *
* LINKAGES:                                                                 *
*       COMMON - Flexible Tolerance, M1COM, T1COM                           *
*       Arguments- BOOM; Bucket size.                                       *
*                                                                           *
*                                                                           *
* EXTERNAL REFERENCES:                                                      *
*                                                                           *
*    RTE, FILE MANAGER, LIBRARY:                                            *
*    ____________  ____________  ____________  ____________  ____________   *
*    ____________  ____________  ____________  ____________  ____________   *
*    ____________  ____________  ____________  ____________  ____________   *
*                                                                           *
*    SPECIAL:                                                               *
*    ____________  ____________  ____________  ____________  ____________   *
*    ____________  ____________  ____________  ____________  ____________   *
*                                                                           *
*    APPLICATION:  (NAME/Program, Subroutine, OR Function)                  *
*    __________/_  __________/_  __________/_  __________/_  __________/_   *
*    __________/_  __________/_  __________/_  __________/_  __________/_   *
*    __________/_  __________/_  __________/_  __________/_  __________/_   *
*    __________/_  __________/_  __________/_  __________/_  __________/_   *
*    __________/_  __________/_  __________/_  __________/_  __________/_   *
*                                                                           *
* DATA FILES ACCESSED:                                                      *
*    ____________  ____________  ____________  ____________  ____________   *
*    ____________  ____________  ____________  ____________  ____________   *
*                                                                           *
*****************************************************************************
```

SEAPLAN SOFTWARE DOCUMENTATION LEVEL:

ROUTINE NAME: TOPO AUTHOR: Lehman

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &TOPO

TYPE:
[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Prepares data and parameters, previously initialized, for contour displays of gridded data.

ACCESSED BY:
DENRV

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
RMPAR EXEC

SPECIAL:
TCS DSP SWAP

APPLICATION: (NAME/Program, Subroutine, OR Function)
GRDIN / CNTRG / ZOOM / BOX /

DATA FILES ACCESSED:
GRID

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: TPWR

AUTHOR: Elm

REVISION CODE:

DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &TPWR

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

TPWR uses given bucket tragectory coordinates and calculates the time and energy needed to move the bucket through that path.

ACCESSED BY:

MOVE SWGA OBR

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

SPEED/S

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: TRACK — AUTHOR: Elm

REVISION CODE: — DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &TRACK

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

TRACK draws the dragline tracks to seal.

ACCESSED BY:
DRWXS

LINKAGES: COMMON - Tecktronix; 1 pass(MOD2) and 2 pass (MOD2) models, and DIAGR blocks. Arguments - IVIEW, SCALE, XOFF - IVIEW not used, SCALE and XOFF are scaling & location variables.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
MOVEA(TCS) MOVER(TCS) DRAWR(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL:

ROUTINE NAME: TRD

AUTHOR: Lehman

REVISION CODE: 1.0

DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &TRD file

TYPE:

[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Produces three dimensional display of gridded data on CRT or plotter.

ACCESSED BY:

DENRV

LINKAGES:

None

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

TCS DSP SWAP

APPLICATION: (NAME/Program, Subroutine, OR Function)

STUP3 /P PLT3D /S FILBF /S FRAM R /S

DATA FILES ACCESSED:

GRID

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: UPCAS

AUTHOR: ELM

REVISION CODE:

DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &UPCAS

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Originally UPCASE, this routine controls update and display of the dragline simulation case parameters.

ACCESSED BY:

DATA

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ERASE(TCS) HOME(TCS) SPOLU(SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

Case data file

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: UPCAS

AUTHOR: ELM

REVISION CODE:

DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &UPCAS

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Originally UPCASE, this routine controls update and display of the dragline simulation case parameters.

ACCESSED BY:

DATA

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ERASE(TCS) HOME(TCS) SPOLU(SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

Case data file

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: UPDAT — AUTHOR: Lehman

REVISION CODE: — DATE: 8/3/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This routine reads the header information of a continuous data file (built by CONCN) and up dates the minimum and maximum elevations.

ACCESSED BY:

CONCN

LINKAGES:

FILE
ZMIN
ZMAX

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

CLOSE (RTE) WRITF (RTE)
OPEN (RTE)
READF (RTE)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL:

ROUTINE NAME: UPDAT

AUTHOR: Conners

REVISION CODE: 1.0

DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &STMBV and &CSEDT file

TYPE:

[ ] PROGRAM [x] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Modifies header record of a grid data file.

ACCESSED BY:

STMBV CSEOT

LINKAGES:

Arguments include file name and new minimum and maximum "Z" values.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

FMP

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

GRID

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: UPFLG

AUTHOR: Elm

REVISION CODE:

DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &UPFLG

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

UPFLG controls the manipulation (updating) of the dragline simulation flags. These flags control the diagnostic output for the programs.

ACCESSED BY:
DATA

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
~~ERASE(TCS)~~ ~~HOME(TCS)~~ SPOLU(SYS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:
flag data file

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: UPSET

AUTHOR: Elm

REVISION CODE:

DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &UPSET

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

The main routine for controlling input and update of the mine and dragline parameters, or the parameter data activity in the dragline simulator.

ACCESSED BY:

DATA

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ERASE(TCS) HOME(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DSPAC/S DSPPD/S PRNPD/S

DATA FILES ACCESSED:

parameter data file

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 3

ROUTINE NAME: USER — AUTHOR: Elm

REVISION CODE: — DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &USER

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

USER interrogates tje user for design information regarding a dragline stripping design. Bits are set in IMDL to indicate mining method use.

ACCESSED BY:
PITON

LINKAGES: C6MMON - Tektronix,MOD1,MOD2 blocks, Arguments - IMOD, NX, MIC,NC; Model selection play and optimization (Flexiable Parameters) variables.

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
CHSLZ(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 3

ROUTINE NAME: VERB AUTHOR: Elm

REVISION CODE: DATE: 7/30/79

LOCATION / ACCESS PROCEDURE: &VERB

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

VERB output character strings which identify the spoil pile (plan view) and coal seam (cross section) on casting diagrams.

ACCESSED BY:
DRWXS DRWPL

LINKAGES:

COMMON - DIAGR block (other for position)

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
ANMOD(TCS) CHSIZ(TCS) DRWPL(TCS) GETLV(DSP) MOVEA(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION

LEVEL: 4

ROUTINE NAME: WDAT

AUTHOR: Elm

REVISION CODE:

DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &MDUT1

TYPE:

[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Dummy routine substituted for McDonnell Douglas

ACCESSED BY:

MOVE

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: WRHDR — AUTHOR: Elm

REVISION CODE: — DATE: 8/25/79

LOCATION / ACCESS PROCEDURE: &WRHDR

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Displays parameter data identification header above the parameter data column as part of the update activity.

ACCESSED BY:
DSPPD

LINKAGES:

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:
LV5, LV6 – assignments vary

SEAMPLAN SOFTWARE DOCUMENTATION — LEVEL: 4

ROUTINE NAME: XLINE — AUTHOR: W. Larson

REVISION CODE: — DATE: 5/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

This subroutine DRAWS the critical level line on the graph for test hole correlations for core hole data.

ACCESSED BY:
GRFF

LINKAGES:

RFIAG, CNT, ICT, ZZ, ZZN, IUSER, IFIRST

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:
ANMOD(TCS) MOVEA(TCS)
DASHA(TCS) MOVRL(TCS)
DRWRL(TCS)

SPECIAL:

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL: 3

ROUTINE NAME: XSEC AUTHOR: W. Larson

REVISION CODE: DATE: 5/79

LOCATION / ACCESS PROCEDURE: DATA ENTRY AND REVIEW

TYPE:

[X] PROGRAM [ ] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Builds XYZ file from binary keyed files: Allows user to select specific test holes to be analyzed by making cross section cuts.

ACCESSED BY: Run XSEC

LINKAGES:

ITEK, COMMON BLOCK

EXTERNAL REFERENCES:

RTE, FILE MANAGER, LIBRARY:

ANMOD(TCS)	DRWAB(TCS)	INITT(TCS)	SPOLU(SYS)	VWNDO(TCS)
CHSIZ (TCS)	ERASE(TCS)	MOVAB(TCS)	SWNDO(TCS)	
DRAWA (TCS)	EXEC(RTE)	MOVEA(TCS)	VCRSR(TCS)	

SPECIAL: Make sure first words of Common are COMMON TRECL,KEYL, NKEY, NBLOK,IBLOKL,IUSER

APPLICATION: (NAME/Program, Subroutine, OR Function)

RTRVL /P

DATA FILES ACCESSED:

SEAMPLAN SOFTWARE DOCUMENTATION LEVEL:

ROUTINE NAME: ZOOM AUTHOR: Lehman

REVISION CODE: 1.0 DATE: 6/1/79

LOCATION / ACCESS PROCEDURE: &TOPO and &PTOPO files

TYPE:
[ ] PROGRAM [X] SUBROUTINE [ ] FUNCTION

GENERAL DESCRIPTION:

Allows user to manipulate crosshair to zoom in a portion of a contour display.

ACCESSED BY:
TOPO PTOPO

LINKAGES:

Uses TOPO / PTOPO common.

EXTERNAL REFERENCES:

RTF, FILE MANAGER, LIBRARY:

SPECIAL:
TCS

APPLICATION: (NAME/Program, Subroutine, OR Function)

DATA FILES ACCESSED:

VOLUME III

SEAMPLAN
PROGRAM DOCUMENTATION

APPENDIX C

APPENDIX C

COMMON BLOCK VARIABLE DEFINITIONS

PITDN Module COMMON Blocks

In the PIT N Module, several COMMON blocks are used. While these blocks are not in the MSU RTE III implementation "LABELED", the relative independence of program modules allows selection of particular BLANK COMMON for individual programs. Hence, pseudo labels have been attached to each such block, and in converting to other systems, these blocks would, in fact, be made LABELED COMMON blocks. Table 1 summarizes the blocks and their use. Sizes will vary with machine

Table 1. -- COMMON Blocks and Their Use

PSEUDO NAME	SIZE (16 BIT WORDS)	USE
ITEK	45	Tektronix (TCS) graphics routine communication
M1COM	234	1 and 2 pass dragline model variable area
M2COM	41	2 pass (MOD2) variable area
FDIAGM	112	DIABR (costing diagram generation) COMMON area
IDPCM1	156	Dynamic programming multipit variable block
IDPCM2		

M1COM COMMON Block

The M1COM is used for communication between the dragline module and other PITDN module routines, including the casting diagram generation programs. Although some variable usage is different in the MOD1 and MOD2 routines, for themost part they are the same. Individual variables and their use are defined on the following pages. Some usage differs slightly in MOD2, and slightly different names are used in the DIAGR segment in some cases. Where usage is different it has been noted with most differences in X vector!

%M1DEF T=00004 IS ON CR00013 USING 00021 BLKS R=0082

0001	A1A	Yd**3	Key cut area to fill bench
0002	A1B	Yd**3	Key cut area to spoil pile
0003	A2	Yd**3	Main cut area
0004			2nd pass total cut area (2-pass model,MOD2)
0005	A3A	Yd**3	Side bench to fill bench area
0006	A3B	Yd**3	Side bench to spoil pile area
0007	A4	Yd**3	Fill bench area
0008	APROD	Tons*E06	Annual production rate (coal uncovered year) specified or computed
0009	B	yd**3	Dragline bucket size (may be computed)
0010	B1	yd**3	Ist pass dragline bucket size (2-pass models)
0011	B2	yd**3	2nd pass dragline bucket size (2-pass models)
0012	BETA	degrees	Dragline boom angle (to horizontal)
0013	BW	feet	Dragline bucket width
0014	C	feet	Dragline cab radius (to base of boom)
0015	CASTD	feet	Casting distance (used to determine max cut length)
0016	CB	feet	Dragline boom length
0017	CB1	feet	1st pass dragline boom length (2-pass models)
0018	CB2	feet	2nd pass dragline boom length (2-pass models)
0019	CC2	hrs.	Constant (set-up) time to move the dragline
0020	CF		Spoil swell factor (fraction < 1.)
0021	COTB		Cotangent of BETA
0022			(COSB, cosine of BETA in 2-pass models)
0023	COTDEL		Cotangent of DELTA
0024	COTPHI		Cotangent of PHI
0025	COTTHT		Cotangent of THETA
0026			(COTT, same def. in 2 pass models)
0027	CR	feet	Boom height (ground to base of boom)
0028	CTON	$/ton	Cost per ton of coal uncovered (computed)
0029	CZ	feet	Bucket drop from boom tip (minimum)
0030	D	feet	Overburden depth
0031	D1	feet	Side bench depth
0032			or 1st pass bench depth (2-pass models, MOD2 routines)
0033	D2	feet	D-D1
0034			or 2nd pass overburden depth (2-pass models)
0035	D2HAT	feet	D2 + coal seam thickness (T)
0036	D2P	feet	Equals D2 if fender (top of coal), D2HAT if not.
0037	DELTA	degrees	Cutting face angle (to horizontal)
0038	DPRICE	dollars	Dragline purchase price (specified or computed)
0039	F		Dragline bucket fill factor (fraction)
0040	G1B	feet	Distance from top of highwall to spoil pile key cut peak
0041	G2	feet	Distance from top of old highwall to spoil pile main cut peak
0042	G4	feet	" " " to rehandle mat'l spoil pile peak

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HOURS     hours       Time to dig 1 cubic yard of overburden(avg. including walk time)
IENDR                 0/1 flag to indicate whether top or bottom of coal spoiling selected
IMDL                  Mining method and model selection mask
                      Bits are set so that the following is true:
                      IAND(IMDL,1)=1 => Key cut is to be made
                         .       2)=2 => Main cut is to be made
                         .       4)=4 => Side benching selected
                         .       8)=8 => Fill (rehandle) bench selected

                      IAND(IMDL,256)=256 => Top of coal spoiling selected
                         .       512)=512 => Side bench width fixed by user
                         .      8142)=8142=> Two pass model selected
IOBJ                  Objective function selection code
                      =1 => minimize time
                      =2 => minimize cost per ton of coal uncovered
IVAR                  Decision variable and evaluation mask;
                      Individual bits select options as follows:
                      IAND(IVAR,1)=1 => Pit (cut) geometry variables in the set (W and D1)
                         .       2)=2 => Dragline design vars. in the set (R and CB)
                         .       4)=4 => Multi-pit optimization with dynamic programming algorithm
                         .       8)=8 => Production rate (APROD) fixed
                         .      16)=16 => Purchase price of dragline fixed (DPRICE)
                         .      32)=32 => Annual dragline operating hours fixed (OPHRS)
IXPTR                Array of pointers to X array elements belonging to the decision var. set
L         feet       Cut length
L1        feet        1st pass cut length (2-pass models)
L2        feet       2nd pass cut length
LP        feet        Design area (plan) length
OPHRS     hours       Annual dragline operating hours
PHI       degrees     Highwall angle (to the horizontal)
RADIUS    feet        Dragline dumping radius
RHO       ton/ft**3 Coal density
RLOC                  Model copy of the constraint vector
SAFE      feet        Safe radius for the dragline from the highwall and/or cutting face
T         feet        Coal thickness
TANT                  Tangent of THETA (2- pass models - same as TANTHT)
TANTHT                Tangent of THETA (1-pass models)
THETA     degrees     Spoil angle of repose
V         hrs/ft.     Dragline walking rate
W         feet        Total cut width (top of the overburden)
W1        feet        Key cut width at top of cut
W2        feet        Main cut top of cut width
                      or, same as W22 if 2 -
W3
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W4	feet	Fill bench width (top)
Wsub-i,j	feet	Cut width ith pass jth position (2-pass models)
		(W22 equivalenced to W2 position in M1COM)
WP	feet	Total design area (plan) width
WPIT	feet	Previous cut (spoiling area) width
X(22)	varies	Decision variable (optimization) superset (definition varies with 1 or 2 pas
		1-Pass (MOD1) equivalent variable names:
		(W1=X(1)),(W=X(2)),(L=X(3)),(X1=X1A=X1B=X(4)),
		(X2=X(5)),(Y1,Y1A=X(6)),(Y2=X(7)),(D1=X(8)),(W3=X(9)),
		(W4=X(10)),(X3,X3A,X3B=X(11)),(Y3,Y3A=X(12)),(X4=X(13)),
		(Y4=X(14)),(Y1B=X(15)),(Y3B=X(16)),(B=X(17)),(CB=X(18))
		2-Pass (MOD2) equivalent variable names:
		(W21=X(1)),(W=X(2)),(L2=X(3)),
		(X=X(4)),(X2=X(5)),(Y=X(6)),(Y2=X(7)),
		(D1=X(8)),(W3=X(9)),(W3=X(10)),(X1=X(11)),
		(Y21=X(12)),(X22=X(1)),(Y22=X(14)),(X2=X(15)),
		(Y23=X(16)),(B2=X(17)),(CB2=X(18)),(W11=X(19)),
		(L1=X(20)),(B1=X(21)),(CB1=X(22)),(W2=W22)
Xsub-i	feet	Dragline X location for cut i
Ysub-i	feet	Dragline Y location at cut i
Xsub-i,j	feet	Distance from cut face to dragline center (ith pass,jth pos'n- 2-pass models
Ysub-i,j	feet	Distance from old highwall to dragline center (ith pass,jth position)
XLAST	feet	Dragline location at last position (used to set move times)
YLAST	feet	Dragline Y location at previous position
YB4	feet	Y-bar, A4 - y component of fill bench area centroid

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%M2DEF T=00004 IS ON CR00013 USING 00001 BLKS R=0001

Asub-i,j,s  ft.**2   Area removed (in situ) on the ith pass, jth position
Asub-r,i,j  ft.**2   Rehandle from the ith pass, the jth position
ARTOT       ft.**2   Total rehandle area
BWsub-i     yd.**3   Bucket width for the ith pass dragline
Csub-i      feet     Cab radius on the ith pass dragline
CRsub-i     feet     Boom height for the ith pass dragline (base of boom)
Gsub-i,j    feet     Distance to the spoil peak from the old highwall
                     for the ith pass, jth position material
ITANDM               0/1 flag selects tandum dragline operations
REACHsub-i  feet     Dragline stripping radius, ith pass machine
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CSEDT COMMON BLOCK

GRINT	grid interval for a grid file
IADJC -	adjustment factor to correlate columns of different file
IADJR -	adjustment factor to correlate rows of different files
IDIRED -	indicates direction 1 - rows, 2 - columns
IHX -	contains the X coordinate of the cross-hair cursor position
IHY -	contains the Y coordinate of the cross-hair cursor position
IMAX -	maximum possible integer; on this machine IMAX - 32767. Used as a null indicator.
IN -	array holding source file logical unit numbers
INFIL1 INFIL2 - INFIL3	source file names
IROW -	row or column number of the currently displayed cross-section
ITEK -	holds Tektronix Plot - 10 graphics variables values
JEND -	indicates the position of the last dat point in a row
FOBNAM -	file header name
JSTART -	indicates the position of the first data point in a row
M -	scale values for calculating integer values
MATZ -	matrix holding the integer grid data values
NCOLS -	number of columns in a file
NCOLSW -	number of columns used for windowing
NFILES -	the number of files to be displayed simultaneously
NROWSW -	number of rows used for windowing
OTFIL1 OTFIL2 - OTFIL3	destination file names
RMAX -	maximum possible real number, used as a null indicator; RMAX = 1.E36
ROW -	holds the data values of the currently displayed cross-sections
XAMAX -	maximum value for the scale on the display X-axis
XAMIN -	minimum value for the scale on the display X-axis
XMAX -	maximum X value in a grid file
XMAXW -	maximum X value for windowing (may be maximum of several XMAXs)
XMIN -	minimum X value in a grid file
XMINW -	minimum X value for windowing (may be minimum of several XMINs)

YMAX - maximum Y value in a grid file

YMAXW - maximum Y value for windowing (may be maximum of several YMAXs)

YMIN - minimum Y value in a grid file

YMINW - minimum Y value for windowing (may be minimum of several YMINs)

ZMAX - maximum Z value in a grid file

ZMAX1 - maximum Z value after editing

AMIN - minimum Z value in a grid file

AMIN1 - minimum Z value after editing

ZMINW - minimum Z value for windowing

CS3DD COMMON BLOCK

ADDX - addition factor to move the cross-section horizontally on the screen

ADDY - addition factor to move the cross-section vertically on the screen

EDGE - value at left or right edge of the screen used to determine ADDX

GRID - contains the grid file data

GRINT - grid interval

ICOL - number of columns at a corner of the display

IDIR - direction of the cross-sections 1 - row, 2 - column

ISTRT - indicates the first cross-section to be drawn

IVXYZ - option selector used in PLT3D

JOBNAM - file header name

MASK - necessary for PLT3D, but only used in programs which allow hidden line removal

MSTRT - maximum possible starting cross-section

NAMFIL - source grid file name

NLINE - indicates the cross-section, out of all those included in one display, which is currently being displayed

NPNTS - number of points to be plotted for a cross-section

NUMRC - number of cross-sections to be displayed

OUTBUF - buffer holding the data points of the cross-section to be displayed

PHI - angle of rotation about the Y axis

STEP - sine THETA* cosine PHI

STSP - sine THETA * sine PHI

THETA - angle of rotation about the X axis

VERTEX - saves vertices of the cross-sections for use in framing

XMAX - maximum X value in a grid file

XMIN - minimum X value in a grid file

XSCALE - scaling factor used along the X axis of the display

YMAX - maximum Y value in a grid file

YMIN - minimum Y value in a grid file

YSCALE - scaling factor used along the Y axis of the display

ZMAX - maximum Z value in a grid file

ZMIN - minimum Z value in a grid file

ZSCALE - scaling factor used along the Z axis of the display

GRDIN COMMON BLOCK (Types are implicit)

IPRM (5) - Integer array equivalenced as follows:

IPRM(1): ISTRK - track allocated to pass COMMON block

IPRM(2): ISECT - starting sector of track

IPRM(3): ICODE - operation code

IPRM(4):LENGTH - length of COMMON block

IPRM(5): IER - error flag

GRID (50,50) - Real matrix of Z values read in from grid file

MINX - minimum X index

MAXX - maximum X index

MINY - minimum Y index

MAXY - maximum Y index

JOBNAM (10) - 20 character ASCII file identifier

XMIN - minimum X grid coordinate

YMIN - minimum Y grid coordinate

XMAX - maximum X grid coordinate

YMAX - maximum Y grid coordinate

ZMIN - minimum Z value

ZMAX - maximum Z value

NROWS - number of rows in the grid

NCOLS - number of columns in the grid

GRINT - grid interval; grid cell size

NAMFIL (3) - 6 character ASCII grid file name

CNTUR COMMON BLOCK

ICON	record continuation flag
ICT	record type
IELEV	elevation of the contour
ICPTS	number of X, Y geographical coordinates in the record
XBUF	buffer for X geographical coordinates in the record
YBUF	buffer for Y geographical coordinates in the record
JOBNAM	identification for the file
XMIN, YMIN	geographical coordinates for the map origin
XMAX, YMAX	maximum geographical coordinates of the map
ZMIN	the minimum contour elevation
ZMAX	the maximum contour elevation
INTRVL	the constant interval between contours
GRINT	the grid interval at which the map is drawn
IOFILE	the file name

MLRS/RCLAM COMMON Block (CSSE Block)

ABSDC: Expected angle of the spoil bank (degrees)

ACRESC: Total acres on the property

CESC: Cost to excavate spoil (cents/cu. yd.)

CDCNC: Estimated hourly operating cost for the bulldozer ($/hour)

CDCPR: Estimated hourly ownership cost of the bulldozer ($/hour)

CDPAC: Dozer production coefficient A

CDPBC: Dozer production coeffieient B

CDPHYC: Number of productive hours/year the bulldozer is expected to work

CRVC: Cost for planting ($/acre)

DCYHC: Minimum dozer production possible, from dozer production curve

DDMFC: Distance spoil material is bulldozed by each pass of the bulldozer (feet)

DMNDFC: Minimum distance for which the bulldozer production curve holds true (feet)

DMXDFC: Maximum distance for which the bulldozer production curve holds true (feet)

ECDOC: Expected efficiency of the bulldozer operator (fraction)

FPWC: Fraction of the panel width the bulldozed material is to be moved

FRC: Fraction of material on spoil that has to be rehandled by dozer

HBTC: Height of the topsoil (feet)

PWFC: Width of the working panel (feet

MRFLGC: Flag set to reclamation level

SRAYC: Acres/year requiring grading by the dozers

SRCYYC: Dozer production per year (cu. yd/year)

SRMCYC: Dozer production per year (m. cu. yd/year)

SRMYYC: Number of cubic years/year to be regraded by the dozers

SRNDC: Number of dozers required (integer)

SROAOC: Owner and operating cost for the dozers ($)

SROPNC: Operating cost for the dozers ($)

SROWNC: Ownership cost for the dozers ($)

SSC: Slope of the spoils (degrees)

SRYAC: Number of cubic yards/acre of material to be regraded

SRYARC: Number of cubic yeards/acre of material to be regarded, including material which requires rehandle

TMYC: Number of years it takes to completely mine the given property

TRDYIC: Cost/cu. yard for removing topsoil ($/cu.yd)

TSDYEC: Cost/cu. yard for respreading topsoil ($/cu.yd)

ARRAY (Integer): contains parameters for COMMON transfer

ARRAY(1) ≡ IT : starting track number

ARRAY(2) ≡ ID : disc LU

ARRAY(3) ≡ IS : starting sector number

ARRAY(4) ≡ LCE : length of COMMON transfer

COMMON VARIABLE NAMES IN ALPHABETICAL ORDER

Name	Use	Description
KBAUDR	General	Terminal Logical Unit
KBEAMX	Direct Graphics	Beam X-Coordinate
KBEAMY	Direct Graphics	Beam Y-Coordinate
KDASHT	Virtual Graphics	Dash Specification
KERROR	General	General Error Flag
KGRAFL	General	Graphic Level Flag
KHOMEY	General	Home Y-Value
KHORSZ	A/N	Character Horizontal Size
KKMODE	General	Mode
KLMRGN	A/N	Left Margin
KMAXSX	Virtual Graphics	Screen Window Maximum X
KMAXSY	Virtual Graphics	Screen Window Maximum Y
KMINSX	Virtual Graphics	Screen Window Minimum X
KMINSY	Virtual Graphics	Screen Window Minimum Y
KMOVEF	Direct Graphics	Move Flag
KPCHAR	Direct Graphics	Previous Plot Characters
KRMRGN	A/N	Right Margin
KSIZEF	A/N	Size Flag
KTABLT	Tablet	Tablet Initialization Mode
KVERSZ	A/N	Character Vertical Size
TIMAGX	Virtual Graphics	Imaginary Beam X
TIMAGY	Virtual Graphics	Imaginary Beam Y
TMAXVX	Virtual Graphics	Virtual Window Maximum X
TMAXVY	Virtual Graphics	Virtual Window Maximum Y
TMINVX	Virtual Graphics	Virtual Window Minimum X
TMINVY	Virtual Graphics	Virtual Window Minimum Y
TRCOSF	Virtual Graphics	Relative Vector Cosine Factor
TREALX	Virtual Graphics	Real Beam X
TREALY	Virtual Graphics	Real Beam Y
TRSCAL	Virtual Graphics	Relative Vector Scale Factor
TRSINF	Virtual Graphics	Relative Vector Sine Factor

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#VNADM T=00004 IS ON CR00013 USING 00017 BLKS R=0073

0001  C                GVNADM  VN FOR AREA DRAGLINE MACRO 4-5-76
0002  II1      1.      IMOCH   INCLUDE COAL LOAD AND HAUL
0003  II1      1.      IMODB   INCLUDE ROCK DRILL AND BLAST
0004  II1      1.      IMODL   INCLUDE DRAGLINE
0005  II1      1.      IMOGA   INCLUDE GENERAL & ADMINISTRATIVE
0006  II1      1.      IMOLR   INCLUDE RECLAMATION
0007  II1      1.      IMOPP   INCLUDE PREP PLANT
0008  II1      1.      IMOQB   INCLUDE COAL DRILL AND BLAST
0009  II1      1       IPPT    PP - INDEX TO PLANT TYPE
0010  II0      4       LFCDC   LF - CDC FILE FOR CASH FLOW
0011  II0      5       LFCDE   LF - ECRG CARDS
0012  II0      2       LFIN    LF - CARD READER
0013  II0      6       LFLP    LF - PRINTER
0014  II0     10       LFRD    REGRESS. DATA FILE NO.
0015  II0      0       LOGCA   PRINTS COMMON ARRAYS IF 1 (FOR DEBUG)
0016  II1      0       LOGCF   WRITES CFA CONTROL FILE IF 1
0017  II1      1       LOGDV   PRINTS DEFAULT VARIABLES IF 1
0018  II1      1       LOGEC   WRITES CFA EQUIPMENT FILE IF 1
0019  II1      1.      LOGPA   PRINTS PARAMETERS IF 1
0020  II1    1         LOGRD   PRINTS REGRESS. DATA FILE IF 1
0021  II1      1       LOGSD   WRITES SPECIFICATION DATA IF 1
0022  II1      1       LOGSM   WRITES ECONOMIC SUMMARY IF ONE
0023  IC2      8       NPITS   NO. OF PITS
0024  RD3      71.57   ABHD    ANGLE BURDEN HIGHWALL (DEGREES)
0025  RD3      38.50   ABSD    ANGLE BURDEN SPOILS (DEGREES)
0026  RD3      71.57   ACFD    ANGLE COAL FACE (DEGREES)
0027  RC2      0.      ACRES   ACRES
0028  RC2      0.      BPBYY   OVERBURDEN PRODUCTION YARDS/YEAR
0029  RC2    0.        CDRTY   COAL DEMAND ROM TONS/YEAR/PIT
0030  RD3    .1817E7   CDRTYD  COAL DEMAND ROM TONS/YEAR
0031  RC2      0.      CDRTYX  COMPLEX COAL DEMAND ROM TONS/YEAR
0032  RC2      0.      CDRYY   COAL DEMAND FOR CLH IN REC. YARDS / YEAR
0033  RD3      9680.   CHHDF   COAL HAUL DISTANCE IN FEET - YEAR 1
0034  RC2      0.      COTA    COTANGENT ABHD
0035  RC2      0.      COTB    COTANGENT ACFD
0036  RC2      0.      COTT    COTANGENT ABSD
0037  RC2      0.      CRTAF   COAL REC. TONS/ARCE-FOOT
0038  RD3     3700.    DBBPY   DENSITY OF OVERBURDEN BANK LBS/YARD
0039  RD3     2160.    DCBPY   DENSITY COAL BANK LBS/YARD
0040  RD3      100.    DRSMFH  DRILLING RATE IN SOFT MAT'L. - FT/HR
0041  RD3      .92     ECR     EXPECTED COAL RECOVERY FACTOR
0042  RI1     50.      GAMR    GAA - MINERAL RIGHTS ($/ACRE)
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0043	RI1	.25	GARA	GAA - ROYALTY AMOUNT ($/TON)
0044	RI1	250.	GASR	GAA - SURFACE RIGHTS ($/ACRE)
0045	RI1	0	GAST	GAA - SEVERANCE TAX ($/TON)
0046	RD3	185.614	GATYB	GAA - TONS/YEAR - BASELINE
0047	RI1	.11	GAUP	GAA - UNION PAYMENT ($/TON)
0048	RI1	70.	HBA	HEIGHT OF OVERBURDEN IN FEET (AVERAGE)
0049	RI1	1.	HBT	HEIGHT OF TOPSOIL - FEET
0050	RI1	15.	HC	HEIGHT OF COAL IN FEET
0051	RI1	2000.	PLF	PANEL LENGTH - FEET
0052	RD3	4.095E14	PPBED	PP - BASE ENERGY BTU/YEAR
0053	RD3	75E3	PPBT	PP - BASE TONS/DAY
0054	RC2	0.	PPFHV	PP - FINAL HEAT VALUE
0055	RC2	0.	PPFTY	PP - FINISHED COAL TONS/YEAR
0056	RC2	0.	PPHF	PP - HEAT VALUE FACTOR FOR IPPT
0057	RC2	0.	PPHV	PP - BASE HEAT VALUE FOR IPPT
0058	RI1	1.3E14	PPNED	PP - COMPLEX ENERGY DEMAND BTU/YEAR
0059	RI1	12000.	PPNHV	PP - COAL HEAT VALUE BTU/LB
0060	RC2	0.	PPNS	PP - COMPLEX SIZE TONS/DAY
0061	RD3	250.	PPODY	PP - OPERATING DAYS/YEAR
0062	RC2	0.	PPSF	PP - SIZE FACTOR FOR IPPT
0063	RD3	.3	PRPY	POWDER RATIO - POUNDS / CU. YD.
0064	RD3	100.	PWF	PANEL WIDTH (FEET)
0065	RI1	900.	ROC	RECLAMATION - OTHER COSTS - $/ACRE
0066	RD3	.25	SFB	SWELL FACTOR FOR BURDEN
0067	RD3	.00	SFC	SWELL FACTOR FOR COAL
0068	RC2	0.	SRYT	STRIPPING RATIO YARDS/TONS
0069	RD3	30.	TMY	TOTAL MINING YEARS
0070	RD3	.06	TRF	TOTAL RESISTANCE ON TOPSOIL HAUL ROAD
0071	RC2	0.	VBBY	VOL. OVERBURDEN BANK YARDS
0072	RC2	0.	VCBY	VOL. COAL BANK YARDS
0073	RC2	0.	VCRT	VOL. COAL ROM TONS
0074	RC2	2000.00	WPLAN	PLAN WIDTH (HP IMP.)
0075	RC2	25.	CUTL	CUT LENGTH (HP IMP.)
0076	RC2	0.	HBD	SIDE BENCH DEPTH (HP IMP.)
0077	END			

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#VNCFA T=00004 IS ON CR00013 USING 00023 BLKS R=0095

0001 C        SVNCFA               VARIABLE NAME FILE FOR CFA 8-25-76
0002 II2           1     IPPT$     INDEX TO PLANT TYPE
0003 ID1           1     LCFCD     BUILDS CORRELATION DATA FILE IF 1
0004 ID1           0     LCFDB     LOGS DEBUG ARRAYS IF 1
0005 ID1       1.000     LCFFP     PRINTS THE FINANCIAL PARAMETERS IF 1
0006 ID1       1.000     LCFFSR    PRINTS FINANCIAL SUMMARY REPORT IF 1
0007 ID1       1.000     LCFIL     PRINTS INVESTMENT LIST IF 1
0008 ID1       1.000     LCFIR     PRINTS INFRASTRUCTURE REPORT IF 1
0009 ID1       1.000     LCFMPL    PRINTS MAINTENANCE MANPOWER LIST IF 1
0010 ID1       1.000     LCFOPL    PRINTS OPERATING MANPOWER LIST IF 1
0011 ID1       1.000     LCFPCE    PRINTS PRODN. & CASH EXP. REPORT IF 1
0012 ID1       1.000     LCFPFS    PRINTS PRO-FORMA STATEMENTS IF 1
0013 ID1       1.000     LCFSML    PRINTS SERVICE & MATERIALS LIST IF 1
0014 ID1           1     LCFXY     BUILDS X,Y PLOT FILE IF 1
0015 ID1           0     NEDNC     NEW EQUIP. DATA FOR NEXT CASE IF 1
0016 RI3        2.00     CDR       CAPITAL/DEBT RATIO
0017 RC2   .545139E7     CDRTY$    COAL DEMAND ROM TONS/YEAR (COMPLEX)
0018 RD1      10.000     CEDMW     COST OF ELECTRICITY - $/MEGAWATT HOUR
0019 RD1     300.000     CFDMG     COST OF FUEL - $/M GALS.
0020 RD1        .050     CWDMG     COST OF WATER - $/M GALS
0021 RD1        .100     DAPG      DEPLETION ALLOWANCE - PERCENT OF GROSS
0022 RD1        .500     DAPN      DEPLETION ALLOWANCE - PERCENT OF NET
0023 RD1        .000     DEC       DEBT/EQUITY RATIO CONTROL
0024 RD1       1.000     DER       DEBT/EQUITY RATIO
0025 RD1        .100     DERT      DEBT/EQUITY RATIO TOLERANCE
0026 RI4           0     DM1       RESET DEP. METHOD 1 TO NONZERO VALUE
0027 RI4           0     DM2       RESET DEP. METHOD 2 TO NONZERO VALUE
0028 RI4           0     DM3       RESET DEP. METHOD 3 TO NONZERO VALUE
0029 RI4        .000     ERAEI     ESCAL. RATE - ALL EQUIP. INVEST.
0030 RI4        .000     EREL      ESCAL. RATE - ELECTRICITY
0031 RI4        .000     ERFU      ESCAL. RATE - FUELS
0032 RI4        .000     ERML      ESCAL. RATE - MAINTENANCE LABOR
0033 RI4        .000     ERMM      ESCAL. RATE - MAINTENANCE MATERIALS
0034 RI4        .000     EROL      ESCAL. RATE - OPERATING LABOR
0035 RI4        .000     EROT      ESCAL. RATE - OTHER COSTS
0036 RI4        .000     ERSPC     ESCAL. RATE - SELLING PRICE OF COAL
0037 RI4        .000     ERTI      ESCAL. RATE - TIRES
0038 RI4        .000     ERWA      ESCAL. RATE - WATER
0039 RI4           0     ESPC      ESC. COAL PRICE PER COST ESC. IF 1
0040 RD1           0     EYAEI     ESCAL. YEAR - ALL EQUIP. INVEST.
0041 RD1        .000     EYHC      ESCAL. YEAR - HOURLY COSTS
0042 RD1        .000     EYML      ESCAL. YEAR - MAINTENANCE LABOR
```

0043	RD1	.000	EYOL	ESCAL. YEAR - OPERATING LABOR
0044	RD1	.000	EYSPC	ESCAL. YEAR - SELLING PRICE OF COAL
0045	RD1	1.200	FALC	FACTOR - ANNUAL LEASE COSTS
0046	RD1	.250	FCR	FACTOR - CASH REQUIRMENTS
0047	RD1	.020	FHOC	FACTOR - HOME OFFICE COSTS
0048	RD1	.050	FIPT	FACTOR - INSURANCE & PROPERTY TAX
0049	RD1	.100	FSI	FACTOR - SUPPLIES INVENTORY
0050	RD1	.0625	FWI	FACTOR - WAREHOUSE INVENTORY
0051	RI3	50.	GAMR$	GAA - MINERAL RIGHTS ($/ACRE)
0052	RI3	.25	GARA$	GAA - ROYALTY AMOUNT ($/TON)
0053	RI3	250.	GASR$	GAA - SURFACE RIGHTS ($/ACRE)
0054	RI3	0	GAST$	GAA - SEVERANCE TAX ($/TON)
0055	RI2	17.864	SRYT$	STRIPPING RATIO YARDS/ROM TONS
0056	RI2	1.	HBT$	HEIGHT OF TOPSOIL - FEET
0057	RI2	4.	HC$	HEIGHT OF COAL IN FEET
0058	RI4	0	PC1	RESETS PUR. CODE 1 TO NONZERO VALUE
0059	RI4	0	PC2	RESETS PUR. CODE 2 TO NONZERO VALUE
0060	RI4	0	PC3	RESETS PUR. CODE 3 TO NONZERO VALUE
0061	RI4	0	PC4	RESETS PUR. CODE 4 TO NONZERO VALUE
0062	RI4	0	PC5	RESETS PUR. CODE 5 TO NONZERO VALUE
0063	RI4	0	PC6	RESETS PUR. CODE 6 TO NONZERO VALUE
0064	RI4	0	PC7	RESETS PUR. CODE 7 TO NONZERO VALUE
0065	RC2	.539687E7	PPFTY$	PREPARED COAL TONS/YEAR
0066	RI2	1.3E14	PPNED$	ENERGY DEMAND FOR COMPLEX BTU/YEAR
0067	RI2	12000.	PPNHV$	ROM COAL HEAT VALUE BTU/LB
0068	RD1	1.000	RAAEI	REGIONAL ADJ. - ALL EQUIP. INVEST.
0069	RD1	1.000	RAEL	REGIONAL ADJ. - ELECTRICITY
0070	RD1	1.000	RAFU	REGIONAL ADJ. - FUELS
0071	RD1	1.000	RAML	REGIONAL ADJ. - MAINTENANCE LABOR
0072	RD1	1.000	RAMM	REGIONAL ADJ. - MAINTENANCE MATERIALS
0073	RD1	1.000	RAOL	REGIONAL ADJ. - OPERATING LABOR
0074	RD1	1.000	RAOT	REGIONAL ADJ. - OTHER COSTS
0075	RD1	1.000	RATI	REGIONAL ADJ. - TIRES
0076	RD1	1.000	RAWA	REGIONAL ADJ. - WATER
0077	RD1	0.	RCD	RATE - CASH DIVIDENDS
0078	RI3	.100	RCFD	RATE - CASH FLOW DISCOUNT
0079	RD1	.120	RCI	RATE - CONSTRUCTION INTEREST
0080	RI3	.480	RFIT	RATE - FEDERAL INCOME TAX
0081	RD1	.070	RITC	RATE - INVESTMENT TAX CREDIT
0082	RD1	10.	RLTDR	RATE - L-T DEBT REPAYMENT (YEARS)
0083	RI3	.080	RLTI	RATE - LONG TERM INTEREST
0084	RI2	900.	ROC$	RECLAMATION - OTHER COSTS - $/ACRE
0085	RI3	.100	RSTI	RATE - [illegible]

```
0087  RD1    365.000   VCDY   VALUE - CALENDAR DAYS/YEAR
0088  RD1     20.000   VDAP   VALUE - DAYS ACCOUNTS PAYABLE
0089  RD1     45.000   VDAR   VALUE - DAYS ACCOUNTS RECEIVABLE
0090  RD1     10.000   VDCI   VALUE - DAYS OF COAL INVENTORY
0091  RD1   1976.000   VFCY   VALUE - FIRST CALENDAR YEAR
0092  RD1    250.000   VODY   VALUE - OPERATING DAYS/YEAR
0093  RD1       .000   VSC    VALUE - STARTING CASH
0094  RI3       .000   VSPC   VALUE - REQ. PRICE OF COAL - $/TON
0095  RD1       .000   VUPDH  VALUE - UNION PENSION $/HOUR
0096  END
```

```
#VNLRS T=00003 IS ON CR00013 USING 00027 BLKS R=0000

0001  II1          1        KAC      METHOD OF INPUT - 1, 2, 3, OR 4
0002  II1          1        KSR      SPOIL REGRADE - 1=YES, 0=NO
0003  II0          3        LFCF     LOGICAL FILE FOR CORRELATION DATA
0004  II0          4        LFIN     INPUT FROM CARD READER
0005  II0          9        LFLP     LOGICAL DEVICE FOR LINE PRINTER
0006  II0          2        LFPS     LOGICAL FILE FOR PIT SEGMENTS
0007  II1          1        LOGPA    PRINT INPUT VARIABLES IF = 1
0008  II0          9        LOP      LINE OUTPUT PRINTER DEVICE
0009  II2          3        NAP      NUMBER OF ADDITIONAL PANELS
0010  I*2          0        NP       NUMBER OF PANELS
0011  RC2       0.          ABBY     AREA BURDEN IN BANK YARDS
0012  RI2       63.4349     ABHD     ANGLE OF BURDEN HIGHWALL - DEGREES
0013  RI3       33.6890     ABSD     ANGLE OF BURDEN SPOILS - DEGREES
0014  RC2       0.          ACBT     AREA COAL IN BANK TONS
0015  RC2       0.          ACBY     AREA COAL IN BANK YARDS
0016  RI2       76.00       ACFD     ANGLE OF COAL FACE - DEGREES
0017  R*1       0.          ACRES    ACRES ON PROPERTY
0018  R*1       0.          ACRT     AREA COAL IN RECOVERABLE TONS
0019  R*2      10560.       ALF      AREA LENGTH - FEET
0020  R*2     35071.3       AWF      AREA WIDTH - FEET
0021  RI2       .000        BWBH     BERM WIDTH ON HIGHWALL - FEET
0022  RI2       .000        BWCF     BERM WIDTH ON COAL FACE - FEET
0023  RI2       1.          CATC     CLEARANCE AT TOE OF COAL - FEET
0024  RI3       1.          CDA      DOZER AVAILIBILITY - FRACTION
0025  RI3       31.18       CDCN     DOZER HOURLY OPERATING COST - $/HR
0026  RI3       21.30       CDCP     DOZER HOURLY OWNERSHIP COST - $/HR
0027  RI3      -49.57       CDPA     DOZER PRODUCTION COEF. A
0028  RI3     158000.       CDPB     DOZER PRODUCTION COEF. B
0029  RI3       1800.       CDPHY    DOZER PRODUCTIVE HOURS PER YEAR
0030  RI1   1817179.0       CDRTY    COAL DEMAND - RECOVERED TONS / YEAR
0031  RI1       600.        CGD      COST FOR GENERAL DOZING - $/ACRE
0032  RI1       100.        CLM      COST FOR LAND MANAGEMENT - $/ACRE
0033  RC2       0.          COTA     COTANGENT OF ANGLE OF THE COAL
0034  RC2       0.          COTB     COTANGENT OF ANGLE OF THE OVERBURDEN
0035  RC2       0.          COTT     COTANGENT OF ANGLE OF SPOIL
0036  RI1       200.        CRV      COST FOR REVEGETATION - $/ACRE
0037  RI2       3700.       DBBPY    DENSITY OF BURDEN - BANK LBS / YD
0038  RI2       2160.       DCBPY    DENSITY OF COAL - BANK LBS / YD
0039  RC3       0.          DDMF     DOZING DISTANCE - FEET
0040  RI3       50.         DMNDF    DOZING MINIMUM DISTANCE - FEET
0041  RI3       400.
                                     EFFICIENCY OF DOZER OPERATION
```

0043	RI3	.75	ECDO	EFFICIENCY OF DOZER OPERATION
0044	RI2	.92	ECR	EXPECTED COAL RECOVERY - FRACTION
0045	RC1	0.	EMH	EFFECTIVE MINUTES PER HOUR
0046	RI1	.833	ERO	EFFICIENCY OF LAND RECLAMATION - FRACTION
0047	RI3	1.50	FPW	FRACTION PANEL WIDTH DOZED MAT'L MOVED
0048	RI3	.25	FR	FRACTION OF DOZED MAT'L REHANDLED
0049	R*2	71.	HBA	AVERAGE HEIGHT OF OVERBURDEN - FEET
0050	R*0	20.	HBN	MINIMUM HEIGHT OF OVERBURDEN - FEET
0051	RI1	1.	HBT	HEIGHT OF TOPSOIL - FEET
0052	R*0	119.	HBX	MAXIMUM HEIGHT OF OVERBURDEN - FEET
0053	R*2	4.	HC	HEIGHT OF COAL - FEET
0054	RC2	0.	HSA	HEIGHT OF SPOIL (AVERAGE) - FEET
0055	RC0	0.	HSN	HEIGHT OF SPOIL (MINIMUM) - FEET
0056	RC0	0.	HSX	HEIGHT OF SPOIL (MAXIMUM) - FEET
0057	R*2	10560.	PLF	PANEL LENGTH - FEET
0058	RI1	1800.	PLRHY	PRODUCTIVE LAND RECLAMATION - HRS / YR
0059	R*1	100.	PWF	PANEL WIDTH - FEET
0060	RI2	.04	RAP	RAMP GRADE - FRACTION
0061	RC1	283.4	RAY	RECLAMATION ACRES PER YEAR
0062	RC2	0.	SC	SLOPE OF THE COAL
0063	RI4	1.	SCA	SCRAPER AVAILIBILITY - FRACTION
0064	RI4	38.21	SCCN	SCRAPER HOURLY OPERATING COST - $/HR
0065	RI4	22.26	SCCP	SCRAPER HOURLY OWNERSHIP COST - $/HR
0066	RI4	-.3181	SCPA	SCRAPER PERF. COEF. A
0067	RI4	126.4	SCPB	SCRAPER PERF. COEF. B
0068	RI4	33.5	SCPC	SCRAPER MAXIMUM PERF. SPEED - MPH
0069	RI4	.2254	SCPD	SCRAPER BRAKING COEF. A
0070	RI4	247.8	SCPE	SCRAPER BRAKING COEF. B
0071	RI4	33.0	SCPF	SCRAPER MAXIMUM BRAKING SPEED - MPH
0072	RI4	32.	SCSA	SCRAPER HEAPED CAPACITY - CU YDS
0073	RI4	91.2	SCSC	SCRAPER EMPTY WEIGHT - M LBS
0074	RI4	72.0	SCSD	SCRAPER PAYLOAD - M LBS
0075	RC0	0.	SF	SWELL FACTOR OF BURDEN + 1
0076	RI2	.35	SFB	SWELL FACTOR OF OVERBURDEN - FRACTION
0077	RI4	.43	SFT	SWELL FACTOR OF TOPSOIL - FRACTION
0078	RC2	0.	SH	SLOPE OF THE HIGHWALL
0079	RC3	0.	SRAY	SPOIL REGRADE ACRES PER YEAR
0080	RC3	0.	SRMYY	SPOIL REGRADE DEMAND M YDS / YR
0081	RC3	0.	SRYA	SPOIL REGRADE YARDS / ACRE
0082	RC3	0.	SRYAR	SPOIL REGRADE YDS / ACRE INCL. R/H
0083	RC2	0.	SRYT	STRIPPING RATIO - BANK YDS / REC. TONS
0084	RC2	0.	SS	SLOPE OF THE SPOILS
0085	R*2	0.	SSL	SUM OF THE SEGMENT LENGTHS
0086	RC2	0.	TANA	TANGENT OF ANGLE OF COAL

0087	RC2	0.	TANB	TANGENT OF ANGLE OF OVERBURDEN
0088	RC1	0.	TANT	TANGENT OF ANGLE OF SPOILS
0089	RI4	.70	TMSM	TIME TO MANUEVER AND SPREAD - MINUTES
0090	RC1	0.	TMY	TOTAL MINING YEARS
0091	RI4	.06	TRF	TOTAL RESISTANCE ON HAUL - FRACTION
0092	RC4	0.	TRMYY	TOPSOIL REMOVAL DEMAND M YDS/YR - BANK
0093	RC4	0.	TRSAY	T.S. REM. & SPRD. ACRES / YR
0094	RC2	0.	TRSLFY	LINEAR ADV. OF THE STRIPPING OP. - FT/YR
0095	RC4	0.	TRSPY	T.S. REM. & SPRD. NO. OF PANELS / YR
0096	R*4	0.	TRTDF	TOPSOIL REMOVAL DISTANCE MOVED - FEET
0097	RC4	0.	TSMYY	TOPSOIL SPREAD DEMAND M YDS/YR - LOOSE
0098	R*4	0.	TSTDF	TOPSOIL SPREAD DISTANCE MOVED - FEET
0099	RI4	.90	TTLM	TIME TO LOAD SCRAPER - MINUTES
0100	RI2	2640.	WPLF	WORKING PANEL LENGTH - FEET
0101	RC2	0.	XHBA	EXTENSION OF AVERAGE OVERBURDEN - FEET
0102	RC0	0.	XHBN	EXTENSION OF MINIMUM OVERBURDEN - FEET
0103	RC0	0.	XHBX	EXTENSION OF MAXIMUM OVERBURDEN - FEET
0104	RC2	0.	XHC	EXTENSION OF COAL - FEET
0105	RC2	0.	XHSA	EXTENSION OF AVERAGE SPOIL - FEET
0106	RC0	0.	XHSN	EXTENSION OF MINIMUM SPOIL - FEET
0107	RC0	0.	XHSX	EXTENSION OF MAXIMUM SPOIL - FEET
0108	RC2	0.	XRAMP	EXTENSION OF RAMP - FEET
0109				

```
#VNSEG T=00004 IS ON CR00013 USING 00001 BLKS R=0027

0001  00004.000000071.000015000.0000
0002  00005.000000050.000020000.0000
0003  0000.000000000.000000000.000000
```

```
#VTITL T=00004 IS ON CR00013 USING 00001 BLKS R=0264

0001  *      0501 (ILRS0501) ILLINOIS BASIN
0002  *         1            LAND RECLAMATION SIMULATION
0003
```

[illegible] T=00004 IS ON CR00017 USING 00001 BLKS [illegible]

```
C     THIS FILE CONTAINS THE COMMON BLOCK DESCRIPTIONS
C     FOR THE DIGITIZING ROUTINES    (VERSION ONE)
C
C     COMMON BLOCK DESCRIPTION FOR :
C     PROGRAM CONCN      INPUT FOR CONTINUOUS DATA
C     PROGRAM CONDR      DRAWING ROUTINE FOR CONTINUOUS DATA
C     SUBROUTINE CHIUR   SUBROUTINE TO ACTUALLY DRAW AND LABEL THE DATA
C     SUBROUTINE MAPIO   SUBROUTINE TO PERFORM THE FILE MANIPULATIONS
C                        (I.E. OPEN THE FILE, READ A RECORD, ETC.)
C
C     GRINT   GRID INTERVAL
C     ICODE - FLAG TO INDICATE TO THE CALLED PROGRAMS WHETHER OR NOT
C             THEY WERE CALLED FROM ANOTHER PROGRAM
C             ( 1 - INDICATES THEY WERE CALLED FROM ANOTHER PROGRAM)
C             ( 0 - INDICATES THEY WERE NOT CALLED FROM ANOTHER PROGRAM)
C     ICON  - WORD ONE OF THE RECORD HEADERS
C     ICPTS   COUNTER TO KEEP TRACK OF THE NUMBER OF POINTS IN THE RECORD
C     ICT   - WORD TWO OF THE RECORD HEADERS
C     IELEV - WORD THREE OF THE RECORD HEADERS
C     INTRVL - WORDS TEN - ELEVEN OF THE FILE HEADER
C     IOFILE   THE FILE NAME
C     IPRAM - SWAPPING PARAMETERS
C     ITEK  - THE TEKTRONIX COMMON BLOCK
C     JOBNAM  THE IDENTIFIER FOR THE FILE
C     XBUF  - BUFFER TO HOLD THE POINTS IN THE RECORD
C     XMAX  - THE MAXIMUM REAL VALUE OF THE MAP IN THE X DIRECTION
C     XMIN  - THE MINIMUM REAL VALUE OF THE MAP IN THE X DIRECTION
C     YBUF  - BUFFER TO HOLD THE POINT IN THE RECORD
C     YMAX  - THE MAXIMUM REAL VALUE OF THE MAP IN THE Y DIRECTION
C     YMIN  - THE MINIMUM REAL VALUE OF THE MAP IN THE Y DIRECTION
C     ZMAX  - THE MAXIMUM ELEVATION
C     ZMIN  - THE MINIMUM ELEVATION
C
C     COMMON BLOCK DESCRIPTION FOR :
C     PROGRAM PTDTA      INPUT ROUTINE FOR POINT DATA
C     PROGRAM PNTDR      DRAWING ROUTINE FOR POINT DATA
C     PROGRAM SYMED      EDITING ROUTINE FOR SYMBOL TABLES
C                        USED BY THE POINT DATA ROUTINES
C
C  ICODE - FLAG TO INDICATE WETHER OR NOT THIS PROGRAM WAS
C  ICR      - CARTRIDGE NUMBER TO WHICH THE FILE IS TO BE WRITTEN
C             CALLED FROM ANOTHER PROGRAM OR NOT
```

```
C               (1 -> INDICATES IT WAS CALLED FROM ANOTHER PROGRAM)
C ICRL     - CARTRIDGE NUMBER OF THE SYMBOL TABLE FILE
C IDNAM    - FILE NAME OF THE FILE FOR THE POINT DATA
C IPRM     - SWAPPING PARAMETERS
C IRECK    - COUNTER, KEEPS TRACK OF THE NUMBER OF RECORDS
C            WRITTEN TO THE FILE
C ITEK     - TEKTRONIX COMMON BLOCK
C NAMTL    - THE NAME OF THE SYMBOL TABLE FILE
C
C       COMMON BLOCK DESCRIPTION FOR :
C       PROGRAM RNDIS      INPUT ROUTINE FOR RANDOM DATA
C       PROGRAM RNDRR      DRAWING ROUTINE FOR RANDOM DATA
C
C ICR      - THE CARTRIDGE NUMBER TO WHICH THE FILE IS WRITTEN
C IDNAME   - THE NAME OF THE CREATED FILE
C IPRM     - THE SWAPPING PARAMETERS
C ITEK     - THE TEKTRONIX COMMON BLOCK
C LU       - LOGICAL UNIT NUMBER FOR THE CREATING FILE
C            THIS IS REQUIRED BY THE SYSTEM ROUTINE (SPOLU)
C X        - THE X COORDINATE OF THE POINT ABOUT TO BE PUT
C            IN THE BUFFER
C XMAX     - THE MAXIMUM GEOGRAPHICAL VALUE OF THE X COORD.
C XMIN     - THE MINIMUM GEOGRAPHICAL VALUE  OF THE X COORD.
C Y        - THE Y COORDINATE OF THE POINT ABOUT TO BE PUT
C            IN THE BUFFER
C YMAX     - THE MAXIMUM GEOGRAPHICAL VALUE OF THE Y COORDINATE
C YMIN     - THE MINIMUM GEOGRAPHICAL VALUE OF THE Y COORDINATE
C Z        - ELEVATIONS
C ZMAX     - THE MAXIMUM ELEVATION TO DATE
C ZMIN     - THE MINIMUM ELEVATION TO DATE
```

```
^D1DEF T=00003 IS ON CR00013 USING 00002 BLKS R=0000

0001   DELY                 Change in Y between DPTH & THK entries
0002   DPTH( )    feet      Array of overburden depths (50 ft. intervals)
0003   NSTG                 Number of stages in d.p. to mine the area
0004   NYPTS                Number of DPTH & THK entries (#MINE file)
0005   THK( )     feet      Array of coal seam thicknesses
0006   WOPT( )    feet      Array of optimal pit widths (returned to FLEX)
0007   YEDGE      feet      Location of starting edge for d.p.
```

```
^D2DEF T=00003 IS ON CR00013 USING 00004 BLKS R=0000

DELW                 Change in W (decision value) for evaluation
FSI(K)     Hours     Optimal objective function  stage i, state k.
FSIP1(K)     "       Objective stage i+1, state k.
I                    Stage # index
LUI                  Interactive lu # (9)
LULP                 Line printer lu #(6)
LUSCR                Scratch file (SCFIL) lu #
N                    Total number of stages
NSI                  Number of states, stage i.
NW                   Number of possible decisions (widths) at any stage
WMAX                 Maximum possible cut width (depends on boom length)
WMIN                 Minimum cut width (W) allowed
WPLAN                Planning area width (total)
WSI(K)     Feet      Optimal decision (widths), stage i,state i
WSIP1(K)     "       Objective  stage i+1, state k.
```

[illegible]ME III

APPENDIX D

APPENDIX D

Pit Layout File (#MINE)

During the process of interactive pit layout, the #MINE file is accessed and modified. Although much of the information contained in the file could be passed through COMMON blocks, the file is used to allow for production analysis of an area previously selected, thus allowing the user to bypass the pit layout process if it has already been performed. Further, portions of the file are unused in the current version of the planning system. The file is designed to accommodate proposed future enhancements, such as the ability to lay out multiple segments.

The file is a direct access fixed record length file. For this reason, the system dependent direct access routines are used. The format of the file is as follows:

Recor 1: Header:

Word # TYPE (I = Integer, F = floating point, A = alphanumeric)

1 I Design mode (1 - area averages, 2 - point value, 3 - maximum stripping ratio

2 not used

3 - 4 F overburden depth

5 - 6 F Coal seam thickness

7 - 8 F Length of plan

9 - 10 F Width of plan

11 - 12 F Leading edge

13 - 14 F Design range

15 - 16 F Total area

17 - 18 F Total cubic yards of overburden

19 - 20 F Total tons coal

21 I Number of segments laid cut (always = 1 in current version)

22 I Number of overburden and coal values

23 I Number of pit widths (-1 if only one value, all are same)

24 - 33 not used

34 I Selected map index

35 I Current minimum X index

36 I Current maximum X index

37 I Current minimum Y index

38 I Current maximum Y index

39 - 40 F Current contour interval

41 - 43 A Topography grid file name

44-46 A Topography contour file name

47 - 49 A Overburden Isopach grid file name

50 - 52 A Overburden Isopach contour file name

53 - 55 A Coal Isopach grid file name

56 - 58 A Coal Isopach Contour file name

59 - 61 A Stripping Ratio Grid file name

62 - 64 A Stripping Ratio Contour file name

65 - 128 Not used

Record 2: Pit Segment Corners

1 - 128 F Up to 8 sets of (X,Y) corner coordinates for each segment (current version allows 1 set: 16 words used).

Record 3, 4: Overburden Depth Values

1 - 128 F Up to 64 overburden depth values per record at 50' intervals across the width of the mine area.

Record 5, 6: Coal Seam Thickness Values

1 - 128 F Up to 64 coal seam thickness values per record at 50' intervals across the width of the mine area.

Record 7, 8: Pit Widths

1 - 128 F Up to 64 pit width values per record as solved for by production analysis routines.

Each integer variable is stored as a 16-bit binary integer value. Floating point values are stored in binary in 32-bit double-words. Each 16-bit word can contain 2 alphanumeric characters

ASCII XYZ Data Files

The first form of data acceptable for input to the system is of the unformatted X, Y, Z type. The first record of this type of a data file contains two values: the number of Z-values in each of the subsequent data records and the number of data records which follow. The data records which follow contain an X value, a Y value, followed by up to 5 Z values. All data in the file is ASCII free formatted data, that is,

the values are entered with no regard to column positioning and are separated by commas. Decimal points may or may not be included, as appropriate. Plus signs ("+") are optional for positive values, but minus signs ("-") are required for negative values. These ASCII XYZ data files are accessed only by program MAKFL.

BINARY XYZ Data Files

As the data records in ASCII XYZ data files is read by program MAKFL, it is converted to single precision floating point values and sorted on ascending X within descending Y prior to output to a Binary XYZ data file. Thus the region represented by the binary data is developed from north to south. If more than one point has the same Y coordinate, the most westerly would appear first in the file.

The format of the file is almost identical to the format of STAMPEDE files. The header record constructed by program MAKFL is formatted as follows:

Word 1: File type - 1, binary integer

Words 2 - 3: Minimum X coordinate, binary floating point

Words 4 - 5: Minimum Y coordinate, binary floating point

Words 6 - 7: Maximum X coordinate, binary floating point

Words 8 - 9: Maximum Y coordinates, binary floating point

Words 10 - 15: Not used

Words 16 - 25: 20 characters of file designation, ASCII text.

The data records in the file each contain the X,Y and up to 5 Z values in binary floating point representation. The length of these records varies from 6 words if there is only 1 Z value to 14 words if there are 5 Z values. These records can be considered to be written by the FORTRAN statement:

```
WRITE(IO) X,Y,(Z(I),I = 1, NZS)
```

The final record in the file is a double word containing the single value 1.E36 in binary floating point representation.

GRID FILES

Grid files consist of three types of records: a header record, grid data records, and a terminator record. The header record contains the following information:

Word 1: File type = 2, binary integer

Words 2 - 3: Minimum X coordinate, binary floating point

Words 4 - 5: Minimum Y coordinate, binary floating point

Words 6 - 7: Maximum X coordinate, binary floating point

Words 8 - 9: Maximum Y coordinate, binary floating point

Words 10 - 11: Grid interval in units per grid square, binary floating point

Words 12 - 13: Minimum Z value, binary floating point

Words 14 - 15: Maximum Z value, binary floating point

Words 16 - 25: 20 characters of file description, A2 format.

Each of the data records which follow represent the Z values for one row of a grid. The first such record represents the row with the greatest Y coordinate, and subsequent records represent deriving Y values. Values in the record represent Z values as X varies from left to right, or from west to east. Since the grid may not be square, that is, no Z values may exist at the extremities of the rows due to natural boundaries or missing data, the length of the record may vary. These reocrds can be considered to be written by the FORTRAN statement:

```
WRITE(IP) JSTART, JEND, (Z(J),J = JSTART, JEND)
```

Thus the data records are represented as follows:

Word 1: Starting column in the row, binary integer

Word 2: Ending column in the row, binary integer

Word 3 - N: The JEND-JSTART + 1 Z values, binary floating point

The maximum number of Z values for any row is 50; similarly, 50 is the maximum number of rows in any file.

The last record in the file has both JSTART and JEND set equal to one, and the single Z value is 1.E36. For further information, see the STAMPEDE reference manual.

Definition of File Types for Data Entry and Review

DATA FILE TYPES	ASCII/BINARY	SYSTEM	DESCRIPTION
1. Continu us	Binary	RTE(FMP)	File type 3 - variable length records;
2. Point	Binary	RTE(FMP	Random Access
3. Symbol Table	Binary	DAFMP	Direct Access File Mngment Program fixed length records; direct access
4. Core Hole	Binary	KAFMP	Keyed Access File Mngmnt Program fixed length records; keyed access
5. ASCII X,Y,Z	ASCII	SPOLU	Formatted FORTRAN Binary
6. Binary X,Y,Z	Binary	SPOLU	Read and Writes
7. Grid	Binary	SPOLU	

Refer to Appendix E for detailed descriptions of files.

DATAFL T=00004 IS ON CR00017 USING 00060 BLKS R=0355

```
C
C
C      *************************************************
C      *                                               *
C      * DESCRIBTION OF DATA FILES FOR DIGITIZING ROUTINES *
C      *                                               *
C      *************************************************
C
C
C
C      DESCRIBTION OF DATA FILES USED BY CONCN, AND CONDR
C      ---------------------------------------------------
C
C      THESE ARE RTE-III TYPE 3 FILES
C
C      FILE HEADER
C      WORD   INFORMATION                    TYPE
C      ----   -----------                    ----
C        1    SEAMPLAN FILE TYPE(4)          I
C       2-3   MINIMUM GEOGRAPHICAL X         R
C       4-5   MINIMUM GEOGRAPHICAL Y         R
C       6-7   MAXIMUM GEOGRAPHICAL X         R
C       8-9   MAXIMUM GEOGRAPHICAL Y         R
C      10-11  CONTOUR INTERVAL               R
C      12-13  MINIMUM ELEVATION              R
C      14-15  MAXIMUM ELEVATION              R
C      16-25  JOB NAME                       A
C
C      RECORDS
C      WORD   INFORMATION
C      ----   -----------
C        1    ICON - CONTINUATION FLAG
C               1  - RECORD IS A CONT.
C               2  - START OF A NEW RECORD
C        2    ICT  - RECORD TYPE
C               1  - CONTOUR
C               2  - ROAD
C               3  - WATER (STREAM)
C               4  - BOUNDARY
C               5  - OTHERS
C        3    IELEV- ELEVATION FOR THE CONTOUR
C        4    ICPIS- NUMBER OF X,Y COORD.
```

```
C                     PAIRS IN THE RECORD
C           5   X,Y  - START OF THE GEOGRAPHICAL
C                     X,Y COORDINATE PAIRS
C
C
C
C      DESCRIBTION OF DATA FILES USED BY RNDIS, AND RNDDR
C      ---------------------------------------------------
C
C      THESE ARE ASCII X,Y,Z FILES
C
C      RECORD       INFORMATION
C      ------       -----------
C        1          NZS, NPTS
C                   NZS - THE NUMBER OF ELEVATIONS PER
C                         COORDINATE PAIR
C                   NPTS - THE TOTAL NUMBER OF POINTS
C                          IN THE FILE. (0 -> THE TOTAL
C                          NUMBER OF POINTS IS UNKNOWN)
C      2->N-1       X, Y, Z
C                   X - GEOGRAPHICAL X COORDINATE
C                   Y - GEOGRAPHICAL Y COORDINATE
C                   Z - ELEVATION FOR THE COORDINATE PAIR
C                       (THERE IS ONLY ONE ELEVATION PER PAIR)
C        N          1.E36, 1.E36
C                   (INDICATES AN EOF)
C
C
C      DESCRIBTION OF DATA FILES USED BY PTDTA, AND PNTDR
C      ---------------------------------------------------
C
C      THE MAP FILES ARE RTE-III TYPE 3 FILES.
C      THE SYMBOL TABLES ARE DAFMP FILES.
C      (FOR A DESCRIBTION OF THE SYMBOL TABLES
C       SEE SYMED)
C
C      WORD   INFORMATION                         TYPE
C      ----   -----------                         ----
C        1    SEAMPLAN FILE TYPE (7)               I
C       2-3   MINIMUM GEOGRAPHICAL X               R
C       4-5   MINIMUM GEOGRAPHICAL Y               R
C       6-7   MAXIMUM GEOGRAPHICAL X               R
C       8-9   MAXIMUM GEOGRAPHICAL Y               R
C      10-12  SYMBOL TABLE NAME                    A
```

```
C         13  CARTRIDGE NUMBER OF SYMBOL TABLE     I
C      14-23  JOB NAME FOR THE FILE                A
C
C
C     RECORD
C     WORD    INFORMATION
C     ----    -----------
C        1    SYMBOL NUMBER
C      2-3    GEOGRAPHICAL X COORDINATE OF THE SYMBOL
C      4-5    GEOGRAPHICAL Y COORDINATE OF THE SYMBOL
C     6-15    SPECIFIC SYMBOL IDENTIFICATION
C
C
C
C     DESCRIBTION OF DATA FILES USED BY SYMED, PTDTA, AND PNTDR
C     ---------------------------------------------------------
C
C     THE SYMBOL TABLE FILES ARE DAFMP FILES.
C
C     RECORD
C     WORD    INFORMATION
C     ----    -----------
C        1    THE SYMBOL NUMBER
C     2-11    THE GENERALIZED SYMBOL DESCRIBTION
C    12-51    THE X,Y COORDINATE PAIRS THAT
C               COMPOSE THE SYMBOL. (MAX. OF 10 PAIRS)
C
C
C
C     **************************************************
C     *                                                *
C     * DESCRIBTION OF DATA FILES FOR CORE HOLE ROUTINES *
C     *                                                *
C     **************************************************
C
C
C
C
C     DESCRIBTION OF DATA FILES USED BY XSEC, COREL,
C     GRFF, AND RTRVL
C     ----------------------------------------------
C
C     THESE ARE RTE-III TYPE 2 FILES.
C
```

```
C      FILE HEADER
C      WORD   INFORMATION
C      ----   -----------
C         1   THE SIZE OF THE KEY RECORD (HEADER LENGTH + VALUES)
C         2   THE LENGTH OF EACH KEYED RECORD
C         3   THE TOTAL NUMBER OF KEYS
C         4   THE NUMBER OF HEADER BLOCKS
C         5   THE LENGTH OF THE HEADER BLOCK (INCREMENTS OF 256)
C
C      RECORD
C      WORD   INFORMATION
C      ----   -----------
C        1    KEY (THE PARAMETER NAME)
C      2->N   VALUES FOR THE KEY (PARAMETER)
C
C
C
C      *********************************************
C      *                                           *
C      * DESCRIBTION OF ASCII X,Y,Z DATA FILES *
C      *                                           *
C      *********************************************
C
C
C      THESE FILES ARE USED TO CREATE BINARY X,Y,Z FILES
C      THEY ARE USED BY MKINE, MKOUT, MKSRT, AND DMPFL
C
C
C      RECORD   INFORMATION
C      ------   -----------
C        1      NZS, NPTS
C               NZS - THE NUMBER OF ELEVATIONS FOR EACH
C                     X,Y COORDINATE PAIR
C               NPTS - THE TOTAL NUMBER OF X,Y COORDINATE
C                      PAIRS.
C      2->N     X,Y,Z1,Z2,Z3,Z4,Z5
C               THERE ARE A MAXIMUM OF FIVE ELEVATIONS FOR
C               EACH COORDINATE PAIR
C
C
C
C      *********************************************
C      *                                           *
C      * DESCRIBTION FOR BINARY X,Y,Z DATA FILES *
```

```
C      *                                          *
C      *******************************************
C
C
C      THESE ARE RTE-III TYPE 3 FILES.
C      THEY ARE CREATED FROM TH ASCII X,Y,Z FILES.
C      THEY ARE USED BY NMPRX, STMBS, STMBT, STMBU, STMBV, DMPFL.
C
C
C      HEADER
C      WORD   INFORMATION
C      ----   -----------
C       1     SEAMPLAN FILE TYPE (1)
C      2-3    THE GEOGRAPHICAL MINIMUM X
C      4-5    THE GEOGRAPHICAL MINIMUM Y
C      6-7    THE GEOGRAPHICAL MAXIMUM X
C      8-9    THE GEOGRAPHICAL MAXIMUM Y
C     10-15   0.0
C     16-25   JOB NAME FOR THE FILE
C
C
C      RECORD
C      WORD   INFORMATION
C      ----   -----------
C       1-2   GEOGRAPHICAL X COORDINATE
C       3-4   GEOGRAPHICAL Y COORDINATE
C       5-6   FIRST ELEVATION
C       7-8   SECOND ELEVATION
C       9-10  THIRD ELEVATION
C      11-12  FOURTH ELEVATION
C      13-14  FIFITH ELEVATION
C             (FOR THOSE ELEVATIONS THAT ARE NOT
C               NEEDED A VALUE OF 1.0E36 IS WRITTEN)
C
C
C      TERMINAL RECORD
C      WORD   INFORMATION
C      ----   -----------
C       1-2   A VALUE OF 1.0E36
C       3-14  0.0
C
C
C
C      ***********************************
```

```
C      *                                  *
C      * DESCRIBIION FOR GRID DATA FILES *
C      *                                  *
C      ***********************************
C
C
C      THE GRID FILES ARE RTE-III TYPE 3 FILES.
C      THEY ARE CREATED FROM BINARY X,Y,Z DATA FILES.
C      THEY ARE USED BY GRDNT, OPRAT, CSEDT, CSEIN,
C      CSEDO, CSEOT, CS3DD, TOPO, CNTRG, GRDIN, TRD,
C      STUP3, AND DMPFL.
C
C
C      HEADER
C      WORD   INFORMATION
C      ----   -----------
C        1    SEAMPLAN FILE TYPE (2)
C       2-3   GEOGRAPHICAL MINIMUM X
C       4-5   GEOGRAPHICAL MINIMUM Y
C       6-7   GEOGRAPHICAL MAXIMUM X
C       8-9   GEOGRAPHICAL MAXIMUM Y
C      10-11  GRID INTERVAL
C      12-13  MINIMUM ELEVATION
C      14-15  MAXIMUM ELEVATION
C      16-25  JOB NAME FOR THE FILE
C
C
C
C
```

```
#DRAG  T=00004 IS ON CR00013 USING 00010 BLKS R=0048

0001  C                 #DRAG    VN FOR DLS ROUTINE IN ADM MODEL
0002  R03  0.01         DLCEL    COST OF ELECTRICITY
0003  R08  30.00        DLDY     DEPRECIATION YEARS
0004  R09  0.7200       DLFDP    DIGGING POWER FACTOR
0005  R11  7467.00      DLOHY    OPERATING HOURS/YEAR
0006  R13  8297.00      DLSHY    SCHEDULED HOURS/YEAR
0007  R16  35.00        DLSB     BOOM ANGLE
0008  R21  0.00         DLCRDP   DEFERED PURCHASE
0009  R23  0.00         DLCRFS   FLEET SPARES
0010  A24  DL           DLCRID   EQUIP. ID
0011  A26  01           DLCRMO   MINNING OPERATION
0012  R28  6000.00      DLCROH   OPERATING HOURS/YEAR
0013  R29  4.00         DLCRPL   PURCHASE LEAD TIME
0014  R31  0.80         DLCRSE   STARTUP EFF. FACTOR
0015  R32  8297.0       DLCRSH   SCHEDULED HOURS/YEAR
0016  R33  7.00         DLCRSY   STARTING YEAR
0017  R34  2.00         DL01C1   OPERATOR CLASS CODE
0018  R35  8.00         DL01C2   OILER CLASS CODE
0019  R36  9.00         DL01C3   GROUNDMAN CLASS CODE
0020  R37  0.00         DL01ID   ECID
0021  R38  1.00         DL01Q1   OPERATOR QUANT.
0022  R39  1.00         DL01Q2   OILER QUANT.
0023  R40  1.00         DL01Q3   GROUNDMAN QUANT.
0024  R41  12.00        DL01S1   OPERATOR SCHEDULE CODE
0025  R42  12.00        DL01S2   OILER SCHEDULE CODE
0026  R43  12.00        DL01S3   GROUNDMAN SCHEDULE CODE
0027  R44  70.00        DLD1S1
0028  R45  0.00         DLD1S2
0029  R46  0.00         DLD1S3
0030  R47  0.00         DLD1S4
0031  R48  0.00         DLD1F1
0032  R49  0.00         DLD1F2
0033  R50  0.00         DLD1F3
0034  R51  0.00         DLD1ID
0035  R52  0.00         DLD1T1
0036  R53  0.00         DLD1T2
0037  R54  0.00         DLD1T3
0038  R55  0.00         DLD2BY   BASE YEAR
0039  R56  0.00         DLD2CO   CONSTANT
0040  R58  1.00         DLD2DM   DEPRECIATION METHOD
0041  R59  0.00         DLD2EF   ESCALATION FACTOR
0042  R61  5.00         DLD2PC   PURCHASE CODE
```

```
0043   R62    1.00          DLD2RA   REGIONAL ADJUSTMENT
0044   R63    0.00          DLD2SF   SALVAGE FACTOR
0045   R66    0.00          DLD3FU   FUELS
0046   R70    0.00          DLD3OT   OTHERS
0047   R71    0.00          DLD3TI   TIRES
0048   R72    0.00          DLD3WA   WATER
0049   R88   25.00          DLCABR   CAP RADIUS (FT)
0050   R89   15.00          DLBMHT   BOOM HEIGHT (FT)
0051   R90   15.00          DLBKW    BUCKET WIDTH (FT)
0052   R91    0.80          DLFILF   FILL FACTOR
0053   R92   20.00          DLBKD    BUCKET DROP (FT)
0054   R93    0.50          DLCMT    CONSTANT MOVE TIME (HRS)
0055   R94    0.0013        DLVMT    VARIABLE MOVE TIME (HRS/FT)
0056   R95   15.00          DLCSTD   CASTING DISTANCE (FT)
0057   R96   30.00          DLSFD    SAFE DISTANCE FROM CUT (FT)
0058   END
```

```
#MOD1  T=00004 IS ON CR00013 USING 00001 BLKS R=0006

0001  1,1,0,0
0002  26.,42.,90.,100.,.04,125.,71.57,71.57,38.5,.25,600.,600.,0.,
0003  25.,15.,35.,15.,.8,5.,.5,.0013,15.,30.,
0004  0.,0.,40.,215.,6000.,
0005  2,
0006  1,1,1,
```

```
#MOD1T T=00004 IS ON CR00013 USING 00001 BLKS R=0006

0001  1,1,0,0,
0002  26.,42.,90.,100.,.04,125.,71.57,71.57,38.5,.25,2000.,2000.,0.,
0003  25.,15.,35.,15.,.8,5.,.5,.0013,15.,30.,
0004  0.,0.,40.,211,6500.,
0005  2,
0006  1,1,0,0,0,
```

```
#VNADM T=00004 IS ON CR00013 USING 00017 BLKS R=0073

0001  C                  GVNADM   VN FOR AREA DRAGLINE MACRO 4-5-76
0002  II1     1.         IMOCH    INCLUDE COAL LOAD AND HAUL
0003  II1     1.         IMODB    INCLUDE ROCK DRILL AND BLAST
0004  II1     1.         IMODL    INCLUDE DRAGLINE
0005  II1     1.         IMOGA    INCLUDE GENERAL & ADMINISTRATIVE
0006  II1     1.         IMOLR    INCLUDE RECLAMATION
0007  II1     1.         IMOPP    INCLUDE PREP PLANT
0008  II1     1.         IMOQB    INCLUDE COAL DRILL AND BLAST
0009  II1     1          IPPT     PP - INDEX TO PLANT TYPE
0010  II0     4          LFCDC    LF - CDC FILE FOR CASH FLOW
0011  II0     5          LFCDE    LF - ECRG CARDS
0012  II0     2          LFIN     LF - CARD READER
0013  II0     6          LFLP     LF - PRINTER
0014  II0    10          LFRD     REGRESS. DATA FILE NO.
0015  II0     0          LOGCA    PRINTS COMMON ARRAYS IF 1 (FOR DEBUG)
0016  II1     0          LOGCF    WRITES CFA CONTROL FILE IF 1
0017  II1     1          LOGDV    PRINTS DEFAULT VARIABLES IF 1
0018  II1     1          LOGEC    WRITES CFA EQUIPMENT FILE IF 1
0019  II1     1.         LOGPA    PRINTS PARAMETERS IF 1
0020  II1   1            LOGRD    PRINTS REGRESS. DATA FILE IF 1
0021  II1     1          LOGSD    WRITES SPECIFICATION DATA IF 1
0022  II1     1          LOGSM    WRITES ECONOMIC SUMMARY IF ONE
0023  IC2     8          NPITS    NO. OF PITS
0024  RD3     71.57      ABHD     ANGLE BURDEN HIGHWALL (DEGREES)
0025  RD3     38.50      ABSD     ANGLE BURDEN SPOILS (DEGREES)
0026  RD3     71.57      ACFD     ANGLE COAL FACE (DEGREES)
0027  RC2     0.         ACRES    ACRES
0028  RC2     0.         BPBYY    OVERBURDEN PRODUCTION YARDS/YEAR
0029  RC2   0.           CDRTY    COAL DEMAND ROM TONS/YEAR/PIT
0030  RD3   .1817E7      CDRTYD   COAL DEMAND ROM TONS/YEAR
0031  RC2     0.         CDRTYX   COMPLEX COAL DEMAND ROM TONS/YEAR
0032  RC2     0.         CDRYY    COAL DEMAND FOR CLH IN REC. YARDS / YEAR
0033  RD3     9680.      CHHDF    COAL HAUL DISTANCE IN FEET - YEAR 1
0034  RC2     0.         COTA     COTANGENT ABHD
0035  RC2     0.         COTB     COTANGENT ACFD
0036  RC2     0.         COTT     COTANGENT ABSD
0037  RC2     0.         CRTAF    COAL REC. TONS/ARCE-FOOT
0038  RD3    3700.       DBBPY    DENSITY OF OVERBURDEN BANK LBS/YARD
0039  RD3    2160.       DCBPY    DENSITY COAL BANK LBS/YARD
0040  RD3     100.       DRSMFH   DRILLING RATE IN SOFT MAT'L. - FT/HR
0041  RD3     .92        ECR      EXPECTED COAL RECOVERY FACTOR
0042  RI1     50.        GAMR     GAA - MINERAL RIGHTS ($/ACRE)
```

```
0043 RI1      .25       GARA    GAA - ROYALTY AMOUNT ($/TON)
0044 RI1   250.         GASR    GAA - SURFACE RIGHTS ($/ACRE)
0045 RI1      0         GAST    GAA - SEVERANCE TAX ($/TON)
0046 RD3    185.614     GATYB   GAA - TONS/YEAR - BASELINE
0047 RI1      .11       GAUP    GAA - UNION PAYMENT ($/TON)
0048 RI1     70.        HBA     HEIGHT OF OVERBURDEN IN FEET (AVERAGE)
0049 RI1      1.        HRT     HEIGHT OF TOPSOIL - FEET
0050 RI1     15.        HC      HEIGHT OF COAL IN FEET
0051 RI1       2000.    PLF     PANEL LENGTH - FEET
0052 RD3       4.095E14 PPBED   PP - BASE ENERGY BTU/YEAR
0053 RD3       75E3     PPBT    PP - BASE TONS/DAY
0054 RC2       0.       PPFHV   PP - FINAL HEAT VALUE
0055 RC2       0.       PPFTY   PP - FINISHED COAL TONS/YEAR
0056 RC2       0.       PPHF    PP - HEAT VALUE FACTOR FOR IPPT
0057 RC2       0.       PPHV    PP - BASE HEAT VALUE FOR IPPT
0058 RI1       1.3E14   PPNED   PP - COMPLEX ENERGY DEMAND BTU/YEAR
0059 RI1       12000.   PPNHV   PP - COAL HEAT VALUE BTU/LB
0060 RC2       0.       PPNS    PP - COMPLEX SIZE TONS/DAY
0061 RD3       250.     PPODY   PP - OPERATING DAYS/YEAR
0062 RC2       0.       PPSF    PP - SIZE FACTOR FOR IPPT
0063 RD3       .3       PRPY    POWDER RATIO - POUNDS / CU. YD.
0064 RD3       100.     PWF     PANEL WIDTH (FEET)
0065 RI1       900.     ROC     RECLAMATION - OTHER COSTS - $/ACRE
0066 RD3      .25       SFB     SWELL FACTOR FOR BURDEN
0067 RD3      .00       SFC     SWELL FACTOR FOR COAL
0068 RC2       0.       SRYT    STRIPPING RATIO YARDS/TONS
0069 RD3      30.       TMY     TOTAL MINING YEARS
0070 RD3      .06       TRF     TOTAL RESISTANCE ON TOPSOIL HAUL ROAD
0071 RC2       0.       VBBY    VOL. OVERBURDEN BANK YARDS
0072 RC2       0.       VCBY    VOL. COAL BANK YARDS
0073 RC2       0.       VCRT    VOL. COAL ROM TONS
0074 RC2    2000.00     WPLAN   PLAN WIDTH (HP IMP.)
0075 RC2      25.       CUTL    CUT LENGTH (HP IMP.)
0076 RC2       0.       HBD     SIDE BENCH DEPTH (HP IMP.)
0077 END
```

```
#VNCFA T=00004 IS ON CR00013 USING 00023 BLKS R=0095

0001  C        SVNCFA               VARIABLE NAME FILE FOR CFA 8-25-76
0002  II2      1          IPPT$     INDEX TO PLANT TYPE
0003  ID1       1         LCFCD     BUILDS CORRELATION DATA FILE IF 1
0004  ID1       0         LCFDR     LOGS DEBUG ARRAYS IF 1
0005  ID1       1.000     LCFFP     PRINTS THE FINANCIAL PARAMETERS IF 1
0006  ID1       1.000     LCFFSR    PRINTS FINANCIAL SUMMARY REPORT IF 1
0007  ID1       1.000     LCFIL     PRINTS INVESTMENT LIST IF 1
0008  ID1       1.000     LCFIR     PRINTS INFRASTRUCTURE REPORT IF 1
0009  ID1       1.000     LCFMPL    PRINTS MAINTENANCE MANPOWER LIST IF 1
0010  ID1       1.000     LCFOPL    PRINTS OPERATING MANPOWER LIST IF 1
0011  ID1       1.000     LCFPCE    PRINTS PRODN. & CASH EXP. REPORT IF 1
0012  ID1       1.000     LCFPFS    PRINTS PRO-FORMA STATEMENTS IF 1
0013  ID1       1.000     LCFSML    PRINTS SERVICE & MATERIALS LIST IF 1
0014  ID1       1         LCFXY     BUILDS X,Y PLOT FILE IF 1
0015  ID1       0         NEDNC     NEW EQUIP. DATA FOR NEXT CASE IF 1
0016  RI3         2.00    CDR       CAPITAL/DEBT RATIO
0017  RC2     .545139E7   CDRTY$    COAL DEMAND ROM TONS/YEAR (COMPLEX)
0018  RD1      10.000     CEDMW     COST OF ELECTRICITY - $/MEGAWATT HOUR
0019  RD1     300.000     CFDMG     COST OF FUEL - $/M GALS.
0020  RD1        .050     CWDMG     COST OF WATER - $/M GALS
0021  RD1        .100     DAPG      DEPLETION ALLOWANCE - PERCENT OF GROSS
0022  RD1        .500     DAPN      DEPLETION ALLOWANCE - PERCENT OF NET
0023  RD1        .000     DEC       DEBT/EQUITY RATIO CONTROL
0024  RD1       1.000     DER       DEBT/EQUITY RATIO
0025  RD1        .100     DERT      DEBT/EQUITY RATIO TOLERANCE
0026  RI4       0         DM1       RESET DEP. METHOD 1 TO NONZERO VALUE
0027  RI4       0         DM2       RESET DEP. METHOD 2 TO NONZERO VALUE
0028  RI4       0         DM3       RESET DEP. METHOD 3 TO NONZERO VALUE
0029  RI4        .000     ERAEI     ESCAL. RATE - ALL EQUIP. INVEST.
0030  RI4        .000     EREL      ESCAL. RATE - ELECTRICITY
0031  RI4        .000     ERFU      ESCAL. RATE - FUELS
0032  RI4        .000     ERML      ESCAL. RATE - MAINTENANCE LABOR
0033  RI4        .000     ERMM      ESCAL. RATE - MAINTENANCE MATERIALS
0034  RI4        .000     EROL      ESCAL. RATE - OPERATING LABOR
0035  RI4        .000     EROT      ESCAL. RATE - OTHER COSTS
0036  RI4        .000     ERSPC     ESCAL. RATE - SELLING PRICE OF COAL
0037  RI4        .000     ERTI      ESCAL. RATE - TIRES
0038  RI4        .000     ERWA      ESCAL. RATE - WATER
0039  RI4       0         ESPC      ESC. COAL PRICE PER COST ESC. IF 1
0040  RD1       0         EYAEI     ESCAL. YEAR - ALL EQUIP. INVEST.
0041  RD1        .000     EYHC      ESCAL. YEAR - HOURLY COSTS
0042  RD1        .000     EYML      ESCAL. YEAR - MAINTENANCE LABOR
```

0043	RD1	.000	EYOL	ESCAL. YEAR - OPERATING LABOR
0044	RD1	.000	EYSPC	ESCAL. YEAR - SELLING PRICE OF COAL
0045	RD1	1.200	FALC	FACTOR - ANNUAL LEASE COSTS
0046	RD1	.250	FCR	FACTOR - CASH REQUIRMENTS
0047	RD1	.020	FHOC	FACTOR - HOME OFFICE COSTS
0048	RD1	.050	FIPT	FACTOR - INSURANCE & PROPERTY TAX
0049	RD1	.100	FSI	FACTOR - SUPPLIES INVENTORY
0050	RD1	.0625	FWI	FACTOR - WAREHOUSE INVENTORY
0051	RI3	50.	GAMR$	GAA - MINERAL RIGHTS ($/ACRE)
0052	RI3	.25	GARA$	GAA - ROYALTY AMOUNT ($/TON)
0053	RI3	250.	GASR$	GAA - SURFACE RIGHTS ($/ACRE)
0054	RI3	0	GAST$	GAA - SEVERANCE TAX ($/TON)
0055	RI2	17.864	SRYT$	STRIPPING RATIO YARDS/ROM TONS
0056	RI2	1.	HBT$	HEIGHT OF TOPSOIL - FEET
0057	RI2	4.	HC$	HEIGHT OF COAL IN FEET
0058	RI4	0	PC1	RESETS PUR. CODE 1 TO NONZERO VALUE
0059	RI4	0	PC2	RESETS PUR. CODE 2 TO NONZERO VALUE
0060	RI4	0	PC3	RESETS PUR. CODE 3 TO NONZERO VALUE
0061	RI4	0	PC4	RESETS PUR. CODE 4 TO NONZERO VALUE
0062	RI4	0	PC5	RESETS PUR. CODE 5 TO NONZERO VALUE
0063	RI4	0	PC6	RESETS PUR. CODE 6 TO NONZERO VALUE
0064	RI4	0	PC7	RESETS PUR. CODE 7 TO NONZERO VALUE
0065	RC2	.539687E7	PPFTY$	PREPARED COAL TONS/YEAR
0066	RI2	1.3E14	PPNED$	ENERGY DEMAND FOR COMPLEX BTU/YEAR
0067	RI2	12000.	PPNHV$	ROM COAL HEAT VALUE BTU/LB
0068	RD1	1.000	RAAEI	REGIONAL ADJ. - ALL EQUIP. INVEST.
0069	RD1	1.000	RAEL	REGIONAL ADJ. - ELECTRICITY
0070	RD1	1.000	RAFU	REGIONAL ADJ. - FUELS
0071	RD1	1.000	RAML	REGIONAL ADJ. - MAINTENANCE LABOR
0072	RD1	1.000	RAMM	REGIONAL ADJ. - MAINTENANCE MATERIALS
0073	RD1	1.000	RAOL	REGIONAL ADJ. - OPERATING LABOR
0074	RD1	1.000	RAOT	REGIONAL ADJ. - OTHER COSTS
0075	RD1	1.000	RATI	REGIONAL ADJ. - TIRES
0076	RD1	1.000	RAWA	REGIONAL ADJ. - WATER
0077	RD1	0.	RCD	RATE - CASH DIVIDENDS
0078	RI3	.100	RCFD	RATE - CASH FLOW DISCOUNT
0079	RD1	.120	RCI	RATE - CONSTRUCTION INTEREST
0080	RI3	.480	RFIT	RATE - FEDERAL INCOME TAX
0081	RD1	.070	RITC	RATE - INVESTMENT TAX CREDIT
0082	RD1	10.	RLTDR	RATE - L-T DEBT REPAYMENT (YEARS)
0083	RI3	.080	RLTI	RATE - LONG TERM INTEREST
0084	RI2	900.	ROC$	RECLAMATION - OTHER COSTS - $/ACRE
0085	RI3	.100	RSTI	RATE - SHORT TERM INTEREST
0086	RD2	12043.	VCBP	VALUE - COAL BTU/POUND

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0087  RD1     365.000   VCDY    VALUE - CALENDAR DAYS/YEAR
0088  RD1      20.000   VDAP    VALUE - DAYS ACCOUNTS PAYABLE
0089  RD1      45.000   VDAR    VALUE - DAYS ACCOUNTS RECEIVABLE
0090  RD1      10.000   VDCI    VALUE - DAYS OF COAL INVENTORY
0091  RD1    1976.000   VFCY    VALUE - FIRST CALENDAR YEAR
0092  RD1     250.000   VODY    VALUE - OPERATING DAYS/YEAR
0093  RD1        .000   VSC     VALUE - STARTING CASH
0094  RI3        .000   VSPC    VALUE - REQ. PRICE OF COAL - $/TON
0095  RD1        .000   VUPDH   VALUE - UNION PENSION $/HOUR
0096  END
```

```
#VNSEG T=00004 IS ON CR00013 USING 00001 BLKS R=0027

0001  00004.000000071.000015000.0000
0002  00005.000000050.000020000.0000
0003  0000.000000000.000000000.000000
```

```
#VNLRS T=00003 IS ON CR00013 USING 00027 BLKS R=0000

0001  II1          1      KAC     METHOD OF INPUT - 1, 2, 3, OR 4
0002  II1          1      KSR     SPOIL REGRADE - 1=YES, 0=NO
0003  II0          3      LFCF    LOGICAL FILE FOR CORRELATION DATA
0004  II0          4      LFIN    INPUT FROM CARD READER
0005  II0          9      LFLP    LOGICAL DEVICE FOR LINE PRINTER
0006  II0          2      LFPS    LOGICAL FILE FOR PIT SEGMENTS
0007  II1          1      LOGPA   PRINT INPUT VARIABLES IF = 1
0008  II0          9      LOP     LINE OUTPUT PRINTER DEVICE
0009  II2          3      NAP     NUMBER OF ADDITIONAL PANELS
0010  I*2          0      NP      NUMBER OF PANELS
0011  RC2     0.          ABBY    AREA BURDEN IN BANK YARDS
0012  RI2     63.4349     ABHD    ANGLE OF BURDEN HIGHWALL - DEGREES
0013  RI3     33.6890     ABSD    ANGLE OF BURDEN SPOILS - DEGREES
0014  RC2     0.          ACBT    AREA COAL IN BANK TONS
0015  RC2     0.          ACBY    AREA COAL IN BANK YARDS
0016  RI2     76.00       ACFD    ANGLE OF COAL FACE - DEGREES
0017  R*1     0.          ACRES   ACRES ON PROPERTY
0018  R*1     0.          ACRT    AREA COAL IN RECOVERABLE TONS
0019  R*2    10560.       ALF     AREA LENGTH - FEET
0020  R*2    35071.3      AWF     AREA WIDTH - FEET
0021  RI2      .000       BWBH    BERM WIDTH ON HIGHWALL - FEET
0022  RI2      .000       BWCF    BERM WIDTH ON COAL FACE - FEET
0023  RI2     1.          CATC    CLEARANCE AT TOE OF COAL - FEET
0024  RI3     1.          CDA     DOZER AVAILIBILITY - FRACTION
0025  RI3     31.18       CDCN    DOZER HOURLY OPERATING COST - $/HR
0026  RI3     21.30       CDCP    DOZER HOURLY OWNERSHIP COST - $/HR
0027  RI3     -49.57      CDPA    DOZER PRODUCTION COEF. A
0028  RI3    158000.      CDPB    DOZER PRODUCTION COEF. B
0029  RI3     1800.       CDPHY   DOZER PRODUCTIVE HOURS PER YEAR
0030  RI1  1817179.0      CDRTY   COAL DEMAND - RECOVERED TONS / YEAR
0031  RI1     600.        CGD     COST FOR GENERAL DOZING - $/ACRE
0032  RI1     100.        CLM     COST FOR LAND MANAGEMENT - $/ACRE
0033  RC2     0.          COTA    COTANGENT OF ANGLE OF THE COAL
0034  RC2     0.          COTB    COTANGENT OF ANGLE OF THE OVERBURDEN
0035  RC2     0.          COTT    COTANGENT OF ANGLE OF SPOIL
0036  RI1     200.        CRV     COST FOR REVEGETATION - $/ACRE
0037  RI2     3700.       DBBPY   DENSITY OF BURDEN - BANK LBS / YD
0038  RI2     2160.       DCBPY   DENSITY OF COAL - BANK LBS / YD
0039  RC3     0.          DDMF    DOZING DISTANCE - FEET
0040  RI3     50.         DMNDF   DOZING MINIMUM DISTANCE - FEET
0041  RI3     600.        DMXDF   DOZING MAXIMUM DISTANCE - FEET
0042  RI4     2320.       DTBPY   DENSITY OF TOPSOIL - BANK LBS / YD
```

0043	RI3	.75	ECDO	EFFICIENCY OF DOZER OPERATION
0044	RI2	.92	ECR	EXPECTED COAL RECOVERY - FRACTION
0045	RC1	0.	EMH	EFFECTIVE MINUTES PER HOUR
0046	RI1	.833	ERO	EFFICIENCY OF LAND RECLAMATION - FRACTION
0047	RI3	1.50	FPW	FRACTION PANEL WIDTH DOZED MAT'L MOVED
0048	RI3	.25	FR	FRACTION OF DOZED MAT'L REHANDLED
0049	R*2	71.	HBA	AVERAGE HEIGHT OF OVERBURDEN - FEET
0050	R*0	20.	HBN	MINIMUM HEIGHT OF OVERBURDEN - FEET
0051	RI1	1.	HBT	HEIGHT OF TOPSOIL - FEET
0052	R*0	119.	HBX	MAXIMUM HEIGHT OF OVERBURDEN - FEET
0053	R*2	4.	HC	HEIGHT OF COAL - FEET
0054	RC2	0.	HSA	HEIGHT OF SPOIL (AVERAGE) - FEET
0055	RC0	0.	HSN	HEIGHT OF SPOIL (MINIMUM) - FEET
0056	RC0	0.	HSX	HEIGHT OF SPOIL (MAXIMUM) - FEET
0057	R*2	10560.	PLF	PANEL LENGTH - FEET
0058	RI1	1800.	PLRHY	PRODUCTIVE LAND RECLAMATION - HRS / YR
0059	R*1	100.	PWF	PANEL WIDTH - FEET
0060	RI2	.04	RAP	RAMP GRADE - FRACTION
0061	RC1	283.4	RAY	RECLAMATION ACRES PER YEAR
0062	RC2	0.	SC	SLOPE OF THE COAL
0063	RI4	1.	SCA	SCRAPER AVAILIBILITY - FRACTION
0064	RI4	38.21	SCCN	SCRAPER HOURLY OPERATING COST - $/HR
0065	RI4	22.26	SCCP	SCRAPER HOURLY OWNERSHIP COST - $/HR
0066	RI4	-.3181	SCPA	SCRAPER PERF. COEF. A
0067	RI4	126.4	SCPB	SCRAPER PERF. COEF. B
0068	RI4	33.5	SCPC	SCRAPER MAXIMUM PERF. SPEED - MPH
0069	RI4	.2254	SCPD	SCRAPER BRAKING COEF. A
0070	RI4	247.8	SCPE	SCRAPER BRAKING COEF. B
0071	RI4	33.0	SCPF	SCRAPER MAXIMUM BRAKING SPEED - MPH
0072	RI4	32.	SCSA	SCRAPER HEAPED CAPACITY - CU YDS
0073	RI4	91.2	SCSC	SCRAPER EMPTY WEIGHT - M LBS
0074	RI4	72.0	SCSD	SCRAPER PAYLOAD - M LBS
0075	RC0	0.	SF	SWELL FACTOR OF BURDEN + 1
0076	RI2	.35	SFB	SWELL FACTOR OF OVERBURDEN - FRACTION
0077	RI4	.43	SFT	SWELL FACTOR OF TOPSOIL - FRACTION
0078	RC2	0.	SH	SLOPE OF THE HIGHWALL
0079	RC3	0.	SRAY	SPOIL REGRADE ACRES PER YEAR
0080	RC3	0.	SRMYY	SPOIL REGRADE DEMAND M YDS / YR
0081	RC3	0.	SRYA	SPOIL REGRADE YARDS / ACRE
0082	RC3	0.	SRYAR	SPOIL REGRADE YDS / ACRE INCL. R/H
0083	RC2	0.	SRYT	STRIPPING RATIO - BANK YDS / REC. TONS
0084	RC2	0.	SS	SLOPE OF THE SPOILS
0085	R*2	0.	SSL	SUM OF THE SEGMENT LENGTHS
0086	RC2	0.	TANA	TANGENT OF ANGLE OF COAL

```
0087  RC2      0.      TANB    TANGENT OF ANGLE OF OVERBURDEN
0088  RC1      0.      TANT    TANGENT OF ANGLE OF SPOILS
0089  RI4       .70    TMSM    TIME TO MANUEVER AND SPREAD - MINUTES
0090  RC1      0.      TMY     TOTAL MINING YEARS
0091  RI4       .06    TRF     TOTAL RESISTANCE ON HAUL - FRACTION
0092  RC4      0.      TRMYY   TOPSOIL REMOVAL DEMAND M YDS/YR - BANK
0093  RC4      0.      TRSAY   T.S. REM. & SPRD. ACRES / YR
0094  RC2      0.      TRSLFY  LINEAR ADV. OF THE STRIPPING OP. - FT/YR
0095  RC4      0.      TRSPY   T.S. REM. & SPRD. NO. OF PANELS / YR
0096  R*4      0.      TRTDF   TOPSOIL REMOVAL DISTANCE MOVED - FEET
0097  RC4      0.      TSMYY   TOPSOIL SPREAD DEMAND M YDS/YR - LOOSE
0098  R*4      0.      TSTDF   TOPSOIL SPREAD DISTANCE MOVED - FEET
0099  RI4       .90    TTLM    TIME TO LOAD SCRAPER - MINUTES
0100  RI2   2640.      WPLF    WORKING PANEL LENGTH - FEET
0101  RC2      0.      XHBA    EXTENSION OF AVERAGE OVERBURDEN - FEET
0102  RC0      0.      XHBN    EXTENSION OF MINIMUM OVERBURDEN - FEET
0103  RC0      0.      XHBX    EXTENSION OF MAXIMUM OVERBURDEN - FEET
0104  RC2      0.      XHC     EXTENSION OF COAL - FEET
0105  RC2      0.      XHSA    EXTENSION OF AVERAGE SPOIL - FEET
0106  RC0      0.      XHSN    EXTENSION OF MINIMUM SPOIL - FEET
0107  RC0      0.      XHSX    EXTENSION OF MAXIMUM SPOIL - FEET
0108  RC2      0.      XRAMP   EXTENSION OF RAMP - FEET
0109
```

```
#VTITL T=00004 IS ON CR00013 USING 00001 BLKS R=0264

0001  *         0501 (ILRS0501) ILLINOIS BASIN
0002  *            1            LAND RECLAMATION SIMULATION
0003
```

E III

APPENDIX E

TABLE OF CONTENTS

APPENDIX E (CONTINUED)

Page

SOFTWARE DOCUMENTATION

NAME: ALGL

VERSION:
[ ] ORIGINAL
[X] REVISION

AUTHOR: Lehman

DATE: 10/1/78

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
Sets up and schedules the ALGOL compiler.

LOCATION / ACCESS PROCEDURE:
Procedure file resides on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:
::ALGL, source [,[object],[lu]]

DESCRIPTION:
If only the source is specified, defaults are no object file is created, and 6 is the list lu. If the object name is omitted, no file is created, however if lu is specified, the additional comma is required to hold its place. If the object name is "-", "% namr" is created only if the source is "&namc"

The necessary programs are "RP'ed" and "OF'ed" by the procedure.

SOFTWARE DOCUMENTATION

NAME: ASIN

AUTHOR: M. Pexton

DATE: 9-79

VERSION:
[x] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[x] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[x] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[X] APPLICATION
[ ] OTHER

FUNCTION:

Compute ARC SINE of given angle

LOCATION / ACCESS PROCEDURE:

X = ASIN (ANGLE)

Angle is angle in radians

EXECUTING PROCEDURE / CALLING SEQUENCE:

GRFP CR 19

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: AUTOR

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: GAA/DLS

DATE:

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Reset all the TTY's and inform users of a power fail

LOCATION / ACCESS PROCEDURE:

Source file on CR 13

EXECUTING PROCEDURE / CALLING SEQUENCE:

Activated at the time of a power failure

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: BACKUP

VERSION:
[ ] ORIGINAL
[X] REVISION

AUTHOR: HP

DATE: 1/1/79

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[X] RELOCATABLE ASSEMBLY
[X] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Back up disc cartridges to mag tape.

LOCATION / ACCESS PROCEDURE:

All programs references are permanent system programs included at SYSGEN. Object files reside on CR27:SYSGEN.

EXECUTING PROCEDURE / CALLING SEQUENCE:

RTE Utility Programs Reference Manual. (92060-90017)

DESCRIPTION:

RTE Utility Programs Reference Manual. (92060-90017)

SOFTWARE DOCUMENTATION

NAME: BMLOC

AUTHOR: Lehman

DATE: 10/1/77

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Returns 4014 terminal status and current beam position.

LOCATION / ACCESS PROCEDURE:

Included in PLOT-10 library.

EXECUTING PROCEDURE / CALLING SEQUENCE:

CALL BMLOC (ISTAT, IX, IY)

DESCRIPTION:

ARGUMENTS:

ISTAT: see 4014 manual for codes
IX: screen X-coordinate location
IT: screen Y-coordinate location

SOFTWARE DOCUMENTATION

NAME: BPOSN

VERSION:
[ ] ORIGINAL
[X] REVISION

AUTHOR: M. Pexton

DATE: Sept. 1979

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[X] APPLICATION
[ ] OTHER

FUNCTION:

Controls placement of CRT Alpha/numeric beam for messages

LOCATION / ACCESS PROCEDURE:

% GRFP CR 19

EXECUTING PROCEDURE / CALLING SEQUENCE: Call BPOSN (IFUNC, NUMLNS, ICRSEF)

IFUNC -- function of subroutine
0) initialize
1) position A/N beam
2) Adjust A/N beam placement variables without moving beam
3) Erase CRT screen

NUMLNS -- If IFUNC = 1 or 2; number of lines to be out
If IFUNC = 3; number of lines from top of page
If IFUNC = 0; initial value of left margi

ICRSEF -- erase flag
-1) disable autoerase, don't adjust left margin
0) disable auto-erase, adjust left margin if necessary
1) enable auto-erase
If IFUNC = 0; initial value of Y position

DESCRIPTION:

NOTE: This routine cannot be swapped.

SOFTWARE DOCUMENTATION

NAME: CDZAP

AUTHOR:

DATE:

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Clears the locked word in the cartridge directory

LOCATION / ACCESS PROCEDURE:

Source file on CR 13

EXECUTING PROCEDURE / CALLING SEQUENCE:

RU, CSZAP, P1, P2

DESCRIPTION:

Where P1 is the LU of the USER, and P2 $< \emptyset$ is a LU specification $> \emptyset$ cartridge ID

SOFTWARE DOCUMENTATION

NAME: CLOSE

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 12/1/76

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Closes open files when possible.

LOCATION / ACCESS PROCEDURE:

Procedure file resides on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: :CLOSE, name

DESCRIPTION:

an attempt is made to rename the file to its current name.

A file manager error -2 (file already exists) indicates a successful close.

SOFTWARE DOCUMENTATION

NAME: CMPRS

VERSION:
[ ] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 1/15/78

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:
Recover unused disc space from files which exists due to edit operations.

LOCATION / ACCESS PROCEDURE:
Load module resides on CR 2. Source on CR18; object on CR27 SYSGEN

EXECUTING PROCEDURE / CALLING SEQUENCE:
: : RU, CMPRS [,lu[,cr]]

DESCRIPTION:
Any unused sectors will be recovered from each file residing on the cartridge with cartridge reference number "cr". If "cr" is not specified, the user will be asked for its value. The cartridge should be packed when CMPRS is completed.

OFTWARE DOCUMENTATION

NAME: DAFMP

AUTHOR: Larson

DATE: June 1979

VERSION:
[x] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE library
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[x] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Keyed (Indexed) file access

LOCATION / ACCESS PROCEDURE:

Source and ROM on CR 13; must be linked explicitly

EXECUTING PROCEDURE / CALLING SEQUENCE:

See 11a - 11o

DESCRIPTION:

See 11a - 11o

```
C
C
      SUBROUTINE INSRT (KODE,IHEAD,IKEY,IWD,IBUFH)
C                    IF KODE = 1 THEN:
C                     IBUFH  - IS A HEADER BUFFER THAT MUST BE INSERTED
C                     IHEAD - IS THE HEADER BLOCK NUMBER
C                    IWD - IS THE NUMBER OF WORDS TO BE INSERTED
C
C    *****
C
C                    IF KODE = 0 THEN:
C                     IBUFH  - IS THE BUFFER CONTAINING THE DATA PARAMETER VALUES
C                     IHEAD - IS IGNORED
C                    IWD - IS IGNORED
C
C    *****
C
      COMMON IRECL,KEYL,NKEY,NBLOK,IBLOKL,IUSER
      COMMON /DCB/ IDCB(1)
C
      DIMENSION IBUFH(1),IBUFO(784),IBUFN(784),IKEY(1)
C
C                    CHECK KODE
C
      IF (KODE .EQ. 0) GOTO 500
C
C                    KODE = 1 SO INSERT A HEADER BLOCK
C
      NUM = IHEAD + 1
      CALL WRITF (IDCB,IERR,IBUFH,IWD,NUM)
      CALL BLANK(IBUFH,IWD)
      CALL READF (IDCB,IERR,IBUFH,IWD,LEN,NUM)
C
      RETURN
C
C                    KODE = 0 SO INSERT A RECORD !
C
C                    FIRST FIND AN AVAILABLE SPACE & INSERT THE KEY
C
  500 KRECL = (NKEY * (KEYL + 1)) + 5
```

```
      IFLAG = 0
C
      CALL READF (IDCB,IERR,IBUFO,KRECL,LEN,1)
C
C
C
      NLAST = (NKEY-1) * (KEYL+1) +6
      DO 10 I = 6, NLAST, KEYL + 1
C
C
      IF (IBUFO (I) .EQ. -100) GO TO 20
 10   CONTINUE
C
C
      RETURN
C
C                    INSERT KEY IN DATA KEY BLOCK.
C
  20  DO 30 J = 1,KEYL
      K = J + I - 1
      IBUFO(K) = IKEY(J)
 30   CONTINUE
C
C                    SET RECORD NUMBER
C
      IRECN = ((I-6) / (KEYL+1)) + 1
      IBUFO(I + KEYL) = IRECN
C
C                    WRITE INTO DATA KEY BLOCK
C
      CALL WRITF(IDCB,IERR,IBUFO,KRECL,1)
C
      CALL CALC(IRECN,NEWREC,I1)
C
C                    NOW RETRIEVE THE RECORD THAT YOU NEED AND
C                    WRITE IN THE NEW DATA - SO THE PRECEEDING
C                    RECORD DOESN'T GET WRITTEN OVER
C
      CALL READF (IDCB,IERR,IBUFN,IBLOKL,LEN,NEWREC)
C
C                    WRITE NEW DATA STARTING WITH WORD #I1
```

```
C
      DO 60 I = 1,IRECL
  50  IWD = I1 + I - 1
      IF (IWD .GT. IBLOKL) GOTO 55
      IBUFN(IWD) = IBUFH(I)
      GOTO 60
C
C                   THE DATA MUST CONTINUE IN THE NEXT PHYSICAL BLOCK
C
C                     FIRST WRITE IBUFN
C
  55  CALL WRITF (IDCB,IERR,IBUFN,IBLOKL,NEWREC)
C
C                   NOW YOU CAN WRITE IN THE SUCCEEDING BLOCK
C
      CALL BLANK(IBUFN,IBLOKL)
      NEWREC = NEWREC + 1
      I1 = -I + 2
      GOTO 50
  60  CONTINUE
      CALL WRITF(IDCB,IERR,IBUFN,IBLOKL,NEWREC)
      RETURN
      END


FTN4 COMPILER: HP92060-16092 REV. 1805 (780310)

**  NO WARNINGS **  NO ERRORS **   PROGRAM = 01799      COMMON = 00006
```

```
C
C     ***********************************
C
      SUBROUTINE SETUP(NAM)
C
C                  THIS ROUTINE CREATES A KEYED FILE ACCORDING TO THF FOLLOWING
C                  SPECIFIED SIZES:
C                        KEYL - THE LENGTH OF EACH KEY
C                        NKEY - THE NUMBER OF KEYS
C                        IRECL - THE SIZE OF THE KEY RECORD (HEADER LENGTH + VA
C                        NBLOK - THE NUMBER OF HEADER BLOCKS
C                        BLOKL - THE LENGTH OF THE HEAD BLOCK (INCREMENTS OF 25
C                        NAM - THE NAME OF THE FILE BEING CREATED
C
      COMMON IRECL,KEYL,NKEY,NBLOK,IBLOKL,IUSER
      COMMON /DCB/ IDCB
C
      DIMENSION NAM(1),ISIZE(2),IBUF(784),IDCB(784)
C
C
C                  INITIALIZE FILE SIZE
C
      ISIZE(1) = 309
      ISIZE(2) = IBLOKL
C
C                  INITIALIZE DATA KEY STORGE LOCATIONS TO AVAILBALE FLAG
C
      IBUF(1) = IRECL
      IBUF(2) = KEYL
      IBUF(3) = NKEY
      IBUF(4) = NBLOK
      IBUF(5) = IBLOKL
C
      NLAST = (NKEY-2) * (KEYL+1) + 6
      DO 10 I = 6, NLAST, KEYL + 1
      IBUF(I) = -100
   10 CONTINUE
C
C                  SET FLAG FOR END OF KEY STORAGE
C
      LAST = (NKEY-1) * (KEYL + 1) + 6
```

```
      IBUF(LAST) = -999
C
C                    CREATE THE FILE AS TYPE 2
C
      CALL CREAT (IDCB,IERR,NAM,ISIZE,2,0,14)
C
C                    WRITE IRECL,KEYL,AND NKEY INTO FILE
C
      IWORDS = LAST + KEYL
      CALL WRITF (IDCB,IERR,IBUF,IWORDS,1)
C
      RETURN
      END

FTN4 COMPILER: HP92060-16092 REV. 1805 (780310)

**  NO WARNINGS **  NO ERRORS **   PROGRAM = 00913      COMMON = 00006
```

```
      SUBROUTINE BLANK(IBFF,IBLEN)
C
      DIMENSION IBFF(1)
C
      DATA BL /2H  /
C
      DO 10 I = 1,IBLEN
      IBFF(I) = BL
   10 CONTINUE
      RETURN
      END
```

```
FTN4 COMPILER: HP92060-16092 REV. 1805 (780310)

**  NO WARNINGS **  NO ERRORS **   PROGRAM = 00031      COMMON = 00000
```

```
C      ************************************
C
C
C          ********  INTERNAL SUROUTINE   *********
C
      SUBROUTINE CALC (IRECN,NEWREC,IWD)
C
C                   THIS INTERNAL SUBROUTINE WILL LOCATE THE PHYSICAL
C                   RECORD NUMBER - NEWREC - AND THE LOCATION OF WHERE THE FIRST
C                   WORD WILL BE WRITTEN - IWD.
C
      COMMON ITEK(45)
      COMMON IRECL,KEYL,NKEY,NBLOK,IBLOKL,IUSER
C
      INTEGER PBLOCK,FWD
C
C                   CALCULATE THE LOCATION OF THE FIRST
C                   WORD IN THE PARAMETER BLOCK
C
      FWD = ((IRECN - 1) * IRECL) + 1
C
C                   CALCULATE THE NUMBER OF THE BLOCK IN MEMORY - PBLOCK
C
      PBLOCK = ((FWD - 1) / IBLOKL) + 1
C
C                   CALCULATE THE NEW RECORD NUMBER
C
      NEWREC = PBLOCK + NBLOK + 1
C
C                   CALCULATE THE STARTING WORD IN THIS RECORD
C
C     IWD = MOD (FWD,IBLOKL)
      IWD = FWD - ((FWD/IBLOKL) * IBLOKL)
      IF (IWD .EQ. 0) IWD = 1
      RETURN
      END
```

```
FTN4 COMPILER: HP92060-16092 REV. 1805 (780310)

**  NO WARNINGS **  NO ERRORS **   PROGRAM = 00052      COMMON = 00051
```

```
C     ****************************************
C
C
C
      SUBROUTINE OPENK(NAM)
C
C                   THIS PROGRAM OPENS THE FILE CALLED NAM
C                   AND RETRIEVES IRECL (THE RECORD LENGTH),
C                   KEYL (THE KEY LENGTH) AND NKEY (THE NUMBER OF KEYS).
C
      COMMON ITEK(45)
      COMMON IRECL,KEYL,NKEY,NBLOK,IBLOKL,IUSER
      COMMON /DCB/ IDCB
C
      DIMENSION NAM(1),IDCB(784),IBUFH(5)
C
C                   OPEN THE FILE
C
      CALL OPEN (IDCB,IERR,NAM)
C
C
C                   READ FIRST BLOCK TO RETRIEVE THE KEY PARAMETERS
C
      CALL READF (IDCB,IERR,IBUFH,5,LEN,1)
      IRECL = IBUFH(1)
      KEYL = IBUFH(2)
      NKEY = IBUFH(3)
      NBLOK = IBUFH(4)
      IBLOKL = IBUFH(5)
C
      RETURN
      END


FTN4 COMPILER: HP92060-16092 REV. 1805 (780310)

** NO WARNINGS **  NO ERRORS **   PROGRAM = 00053      COMMON = 00051
```

```
C
C                      ****************************************
C
C
C
C
      SUBROUTINE RETRV (KODE,IHEAD,IKEY,IWD,IBUFH)
C
C                      IF KODE = 1 THEN A HEADER IS TO BE RETRIEVED WHERE:
C                       IBUF = THE BUFFER THAT THE HEADER IS READ INTO
C                       IHEAD = THE NUMBER OF THE HEADER BLOCK
C                       IKEY = IS IGNORED
C                       IWD  = IS THE NUMBER OF WORDS TO BE RETRIEVED
C
C                      IF KODE = 0 THEN INFORMATION ABOUT A GIVEN KATA KEY MUST BE
C                      WHERE:
C                       IBUF = THE BUFFER THAT THE DATA IS READ INTO
C                       IHEAD = IS IGNORED
C                       IKEY = THE DATA KEY NAME
C                       IWD = IS IGNORED
C
      COMMON ITEK(45)
      COMMON IRECL,KEYL,NKEY,NBLOK,IBLOKL,IUSER
      COMMON /DCB/ IDCB(1)
C
      DIMENSION IBUFH(1),IBUFO(784),IBUFN(784),IKEY(1)
C
C                      CHECK KODE
C
C
      IF (KODE .EQ. 0) GOTO 500
C
C                      KODE = 1 SO RETRIEVE A HEADER BLOCK
C
      NUM = IHEAD + 1
C
      CALL READF (IDCB,IERR,IBUFH,IWD,LEN,NUM)
C
      RETURN
C
C                      KODE = 0 SO RETRIEVE A RECORD
```

```
C
C                       FIRST FIND THE KEY AND ITS RECORD NUMBER
C
  500  KRECL = (NKEY * (KEYL + 1)) + 5
       CALL READF (IDCB,IERR,IBUFO,KRECL,LEN,1)
C
       NLAST = (NKEY-1) * (KEYL+1) + 6
       DO 20 I = 6, NLAST, KEYL+1
C
C
       DO 10 J = 1,KEYL
       K = J-1+I
       IF (IBUFO(K) .NE. IKEY(J)) GOTO 20
  10   CONTINUE
C
C                       MATCH FOUND
C
       IRECN = IBUFO(I + KEYL)
       GOTO 30
   20  CONTINUE
C
C                       NO MATCH
C
       WRITE (IUSER,999) (IKEY(K),K=1,KEYL)
  999  FORMAT (A2)
       WRITE (IUSER,1000)
 1000  FORMAT (" THIS KEY CAN'T BE FOUND")
C
       RETURN
C
C                       NOW FIND THE PHYSICAL RECORD NUMBER & THE WORD NUMBER
   30  CALL CALC (IRECN,NEWREC,I1)
C
C                       NOW READ THE DATA AND WRITE IT INTO THE RETURN BUFFER - IBUF
C
       CALL READF (IDCB,IERR,IBUFN,IBLOKL,LEN,NEWREC)
C
C
C                       WRITE DATA INTO IBUF FROM IBUFN STARTING WITH WORD #I1
C
       DO 60 I=1,IRECL
```

```
 50   IWDC = I1 + I - 1
      IF (IWDC .GT. IBLOKL) GOTO 55
      IBUFH(I) = IBUFN(IWDC)
      GOTO 60
C
C                    THE DATA IS CONTINUED IN THE NEXT PHYSICAL BLOCK
C
  55  CALL BLANK (IBUFN,IBLOKL)
      NEWREC = NEWREC + 1
      CALL READF (IDCB,IERR,IBUFN,IBLOKL,LEN,NEWREC)
      I1 = -I + 2
 60   CONTINUE
C
      RETURN
C
      END

FTN4 COMPILER: HP92060-16092 REV. 1805 (780310)

**  NO WARNINGS **  NO ERRORS **   PROGRAM = 01794      COMMON = 00051
```

```
C
C
C          ***********************************************************
C
C
      SUBROUTINE CLOSK
C
      COMMON ITEK(45)
      COMMON IRECL,KEYL,NKEY,NBLOK,IBLOKL,IUSER
      COMMON /DCB/ IDCB(1)
C
C
      CALL CLOSE (IDCB)
C
      RETURN
      END

FTN4 COMPILER: HP92060-16092 REV. 1805 (780310)

**  NO WARNINGS **  NO ERRORS **   PROGRAM = 00009      COMMON = 00051
```

```
C
C
C      ***********************************
C
       BLOCK DATA
C
       COMMON /DCB/ IDCB(784)
C
       END
```

```
 FTN4 COMPILER: HP92060-16092 REV. 1805 (780310)

 **  NO WARNINGS **  NO ERRORS **

BLOCK COMMON DCB     SIZE =  00784
```

```
******************************************************
END$
```

SOFTWARE DOCUMENTATION

NAME: DAFMP______________ VERSION:

AUTHOR: _Lehman_________ [X] ORIGINAL

[ ] REVISION

DATE: __1/8/79__________

TYPE:

[ ] PROGRAM

[X] SUBROUTINE

[ ] FUNCTION

[ ] PROCEDURE FILE

[ ] OTHER______________

LANGUAGE:

[X] FORTRAN

[ ] RELOCATABLE ASSEMBLY

[ ] ABSOLUTE ASSEMBLY

[ ] FMGR COMMANDS

[ ] ALGOL

[ ] OTHER______________

CATEGORY:

[X] SYSTEM

[X] UTILITY

[ ] APPLICATION

[ ] OTHER______________

FUNCTION:

Direct file access similar to IBM Define File operations

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27; included in system library at SYSGEN.

EXECUTING PROCEDURE / CALLING SEQUENCE:

See 12a, 12b.

DESCRIPTION:

See 12a, 12b.

```
**********************************************************************

DIRECT ACCESS FILE MANAGEMENT PACKAGE

DESCRIPTION:
    ROUTINES TO SIMULATE IBM DEFINE FILE DIRECT ACCESS ROUTINES.
    DFNFL:         DEFINE FILE.
    DREAD:         DIRECT ACCESS READ.
    DWRITE:        DIRECT ACCESS WRITE.
    CLDFL:         CLOSE / PURGE FILE.

SPECIAL TECHNIQUES:
    HEWLETT-PACKARD BATCH SPOOL MONITOR FMP CALLS

NONSTANDARD CODE:
    NONE

REFERENCES:
    HP BATCH SPOOL MONITOR REFERENCE MANUAL (92060-90013)

ORIGINAL RELEASE:
    12/21/78 - TOM LEHMAN

REVISIONS:
    NONE

**********************************************************************

    SUBROUTINE DFNFL (NAME, ICART, NREC, LEN, ISTAT)

DEFINES DIRECT ACCESS FILE.
    CREATES THE FILE, OR IF IT EXISTS, OPENS AND INSURES
    IT IS COMPATIBLE WITH THE PARAMETERS OF THE CALL.

ARGUMENTS:
    NAME:          3-WORD INTEGER ARRAY CONTAINING FILE NAME
    ICART:         CARTRIDGE REFERENCE # OF FILE
    NREC:          MAXIMUM # OF RECORDS IN THE FILE
    LEN:           RECORD LENGTH
    ISTAT:         STATUS RETURN:
                   < 0: NEGATIVE FMGR ERROR CODE
                   = 0: SUCCESSFUL FILE DEFINITION (CREATED, LEFT OPEN)
                   > 0: FILE ALREADY EXISTED (OPENED)
```

```
     SUBROUTINE DREAD (IBUF, NUM, LEN, ISTAT)

 DIRECT READ ROUTINE

 ARGUMENTS:
     IBUF:          STARTING ADDRESS OF USER BUFFER
     NUM:           RECORD # TO BE READ
     LEN:           LENGTH (IN WORDS) OF RECORD TO BE READ.
                    MUST BE <= ORIGINALLY DEFINED RECORD LENGTH.
                    IF=0 RECORD LENGTH ORIGINALLY DEFINED WILL BE READ.
                    IS RETURNED AS THE # WORDS ACTUALLY READ.
     ISTAT:         STATUS CODE:
                    < 0: NEGATIVE FMGR ERROR CODE
                    = 0: SUCCESSFUL READ

     SUBROUTINE DWRIT (IBUF, NUM, LEN, ISTAT)

 DIRECT WRITE ROUTINE

 ARGUMENTS:
     IBUF:          STARTING ADDRESS OF USER BUFFER
     NUM:           RECORD # TO BE WRITTEN
     LEN:           LENGTH (IN WORDS) OF RECORD TO BE WRITTEN.
                    MUST BE <= ORIGINALLY DEFINED RECORD LENGTH.
                    IF=0 RECORD LENGTH ORIGINALLY DEFINED WILL BE WRITTEN.
     ISTAT:         STATUS CODE:
                    < 0: NEGATIVE FMGR ERROR CODE
                    = 0: SUCCESSFUL WRITE

     SUBROUTINE CLDFL (IOPT, ISTAT)

 CLOSE THE DEFINED FILE, AND OPTIONALLY DELETE IT.

 ARGUMENTS:
     IOPT:          USER OPTION FLAG:
                    = 0: CLOSE THE FILE
                    ≠ 0: CLOSE AND PURGE THE FILE
     ISTAT:         STATUS RETURN:
                    < 0: NEGATIVE FMGR ERROR CODE
                    = 0: SUCCESSFUL CLOSE / DELETE
```

SOFTWARE DOCUMENTATION

NAME: DATE

AUTHOR: Lehman

DATE: 4/1/77

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[ ] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Determines current date.

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27 SYSGEN; included in disc resident library at SYSGEN.

EXECUTING PROCEDURE / CALLING SEQUENCE:

CALL DATE(IDATE)

DESCRIPTION:

Subroutine returns current time in 8 words integer array IDATE as follows:

IDATE (1) = integer hours (1-12) (Integer representation)
IDATE (2) = integer minutes (0-60) (integer representation)
IDATE (3) = integer seconds (0-60) (Integer representation)
IDATE (4) = ASCII "AM" or "PM"
IDATE (5) = ASCII month (first 2 characters)
IDATE (6) = ASCII month (third character, blank)
IDATE (7) = integer day of month
IDATE (8) = integer year

SOFTWARE DOCUMENTATION

NAME: DAXES

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: M Pexton

DATE: Sept. 1979

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[X] APPLICATION
[ ] OTHER

FUNCTION:

Draw axes through given point.

LOCATION / ACCESS PROCEDURE:

%GRFP CR 19

EXECUTING PROCEDURE / CALLING SEQUENCE:

```
Call DAXES (XORG, YORG)
  XORG -- X coordinate of origin
  YORG -- Y coordinate of origin
```

DESCRIPTION:

Axes are drawn to the virtual window borders

SOFTWARE DOCUMENTATION

NAME:__DC.ALL__________ VERSION:
[X] ORIGINAL
AUTHOR:__Lehman________ [ ] REVISION

DATE:____6/1/77__________

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Dismounts perripheral cartridges.

LOCATION / ACCESS PROCEDURE:

Procedure file resides on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: : DC.ALL

DESCRIPTION:

Dismounts all peripheral disc cartridges with lu 11 through 27.

SOFTWARE DOCUMENTATION

NAME: DDATE

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: M. Pexton

DATE: Sept. 1979

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[x] APPLICATION
[ ] OTHER

FUNCTION:

Display current time and date at given location on CRT screen

LOCATION / ACCESS PROCEDURE:

%GRFP CR19

EXECUTING PROCEDURE / CALLING SEQUENCE:

CALL DDATE (IX, IY)
IX -- CRT screen X coordinate
IY -- CRT screen Y coordinate

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: DISPLAY SOFTWARE

VERSION:
[ ] ORIGINAL
[X] REVISION

AUTHOR: Bob Huntsman

DATE: 3/8/79

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:
Provides spooled access to plotter via Tektronix Plot-10 calls.

LOCATION / ACCESS PROCEDURE:

Source on CR17; object in %DSPP on CR2

EXECUTING PROCEDURE / CALLING SEQUENCE:

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: DVR12

AUTHOR: Pexton

DATE: 12/15/77

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
Line printer driver for LA180 Decwriter 1.

LOCATION / ACCESS PROCEDURE:
Memory resident program

EXECUTING PROCEDURE / CALLING SEQUENCE:

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: DWNDO

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: M. Pexton

DATE: Sept. 1979

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[X] APPLICATION
[ ] OTHER

FUNCTION:

Outline Tekronix CRT screen window

LOCATION / ACCESS PROCEDURE:

%GRFP CR19

EXECUTING PROCEDURE / CALLING SEQUENCE:

Call DWNDO

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: EB2AS

AUTHOR: Lehman

DATE: 4/1/77

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Converts EBCDIC records to ASCII equivalent.

LOCATION / ACCESS PROCEDURE:

Load module resides in type 6 file on CR2. Source on CR18; object on CR27 SYSGEN.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: RU, EB2AS (conversational input required)

DESCRIPTION:

Converts EBCDIC records at user specified source (mag tape or disc file) and stores ASCII in disc file.

SOFTWARE DOCUMENTATION

NAME: EDIT

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 12/18/78

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Creates, schedules, and releases a temporary copy of EDITR.

LOCATION / ACCESS PROCEDURE:

Procedure file resides on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: :EDIT

DESCRIPTION:

A temporary copy of the editor is created from EDI00::2 based on the terminal logical unit. This copy is scheduled, then is released upon termination of the edit session. All edit commands function as described in the RTE EDITR manual.

SOFTWARE DOCUMENTATION

NAME: ERASE

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR:

DATE:

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[x] APPLICATION
[ ] OTHER

FUNCTION:

Erases the screen

LOCATION / ACCESS PROCEDURE:

Source file on CR 13

EXECUTING PROCEDURE / CALLING SEQUENCE:

RU, ERASE

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: EX

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 12/15/78

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Exits a copy of FMGR and releases ID segment.

LOCATION / ACCESS PROCEDURE:

Procedure file resides on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: : EX

DESCRIPTION:

Calculates the name of the current copy of FMGR scheduled by FMG and terminates it, releasing the ID segment. See also FMG.

SOFTWARE DOCUMENTATION

NAME: EXECO

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 11/4/78

TYPE:
[X] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Provides a patch to call EXEC routines from ALGOL.

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27 SYSGEN: included in disc resident library at SYSGEN

EXECUTING PROCEDURE / CALLING SEQUENCE:

See HP ALGOL Reference Manual, Section 7-3 (02116-9072)

DESCRIPTION:

See HP ALGOL Reference Manual, Section 7-3 (02116-9072)

SOFTWARE DOCUMENTATION

NAME: FEXIT

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 5/25/78

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
Exits FMGX

LOCATION / ACCESS PROCEDURE:

Procedure file resides on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:
CALL EXEC (23, FMGX, 2HFE, 2HXI, 2HTI, ...)

DESCRIPTION:

Used when a command string is passed to FMGX when scheduled from a user program. See also IDSEG.

SOFTWARE DOCUMENTATION

NAME: FEXT

VERSION:
[x] ORIGINAL
[ ] REVISION

AUTHOR:

DATE:

TYPE:
[x] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[x] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[x] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Re-writes a track and a sector

LOCATION / ACCESS PROCEDURE:

Source file on CR 13

EXECUTING PROCEDURE / CALLING SEQUENCE:

RU, FEXT

DESCRIPTION:

This program is usually used to fix up files with extents.

SOFTWARE DOCUMENTATION

NAME: FF

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 12/1/76

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

issues form feed to line printer

LOCATION / ACCESS PROCEDURE:

Procedure file resides on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: :FF -or- * RU, FMGR, FF

DESCRIPTION:

Issuess form feed to line printer

SOFTWARE DOCUMENTATION

NAME: FMG

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 12/15/78

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[X] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
Creates and schedules a copy of FMGR.

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27; included as program during system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:

* RU, FMG

DESCRIPTION:

Creates a copy of FMGR based on the user terminal lu (≠ 1), schedules the copy with the list lu set to the terminal. : : EX should be used to terminate the session. See also EX

SOFTWARE DOCUMENTATION

NAME: FORT

AUTHOR: Lehman

DATE:

VERSION:
[ ] ORIGINAL
[X] REVISION

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Sets up and schedules the FORTRAN compiler.

LOCATION / ACCESS PROCEDURE:

Procedure file is on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: :FORT, source [,[object],[lu],[options]]

DESCRIPTION:

If only the source is specified, defaults are no object file created, 6 is the list lu, and options in the FTN4 control statement are used. If the object name is omitted, no file is created, however, if lu or option are specified, the commas are required to hold it's place. If the object name is "-" ,"%name" will be created only if the source is "&NAMR. The options, if included, override those in the FTN4 control statement. A separate copy of the compiler is created for each terminal from the master copy, FTN00::2

SOFTWARE DOCUMENTATION

NAME: FSORT

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: CGS

DATE: 4/1/78

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[X] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[ ] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
ASCII disc file sort

LOCATION / ACCESS PROCEDURE:

Load module resides on lu 2; source on CR18

EXECUTING PROCEDURE / CALLING SEQUENCE:

: RU, FSORT [,p1[,p2]]

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: IDENT

AUTHOR: Lehman

DATE: 6/1/78

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER____________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER____________

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER____________

FUNCTION:

Writes identifier on user specified lu.

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27 SYSGEN; included in system library at sysgen.

EXECUTING PROCEDURE / CALLING SEQUENCE:

CALL IDENT (LU, IDATE, ID)

DESCRIPTION:

Writes a 6 character identifier followed by the time and date on a specified lu.

ARGUMENTS:

LU: logical unit which to write
IDATE: 8 word integer array containing current time; can be created by calling DATE.
ID: 3 word integer array containing an ASCII identifier.

SOFTWARE DOCUMENTATION

NAME: IDSEG/IDCHK

VERSION:
[ ] ORIGINAL
[X] REVISION

AUTHOR: Mooney/Lehman

DATE: 5/1/77

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
RP's/ OF's ID sements.

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27 SYSGEN; included in disc resident library at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:
CALL IDSEG (IPNAME, KODE)

DESCRIPTION:
Checks for the existence of the ID segment requested, using IDCHK; then, if appropriate, "RP's" or "OF's" the program.

ARGUMENTS:

IPNAME: 3 word integer array containing ASCII program name.

KODE: operations code: 1=RP, 2=OF.

FMGX is used to perform the RP or OF.

SOFTWARE DOCUMENTATION

NAME: IEOR

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR:

DATE:

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Exclusive or of 2 arguments

LOCATION / ACCESS PROCEDURE:

Source file on CR 13

EXECUTING PROCEDURE / CALLING SEQUENCE:

Integer variable = IEOR (ARG1, ARG2)

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: INTERACTION

AUTHOR: Huntsman

DATE: 11/1/79

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Standardizes user interaction

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27 SYSGEN; included in library at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: ISA

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 2/1/77

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[X] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Arithmetic shift.

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27SYSGEN; included in library at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:

Integer variable = ISA(argument, n)

DESCRIPTION:

Argument is shifted left arithmetically the number of bits specified in n. If n is negative, the shift is to the right.

SOFTWARE DOCUMENTATION

NAME: ISC

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 2/1/77

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[X] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
Circular shift.

LOCATION / ACCESS PROCEDURE:
Source on CR18; object on CR27 SYSGEN; included in library at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:

Integer variable = ISC (argument, n)

DESCRIPTION:
Argument is shifted left circularly the number of bits specified in n. If n is negative, the shift is to the right.

SOFTWARE DOCUMENTATION

NAME: ISL

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 2/1/77

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[X] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
Logical shift

LOCATION / ACCESS PROCEDURE:
Source on CR18; object on CR27 SYSGEN; included in library at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:

Integer variable = ISL (argument, n)

DESCRIPTION:
Argument is shifted left logically the number of bits specified in n. If n is negative, the shift is to the right.

OFTWARE DOCUMENTATION

AME: KAFMP

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Larson

ATE: June 1979

TYPE:
[ ] PROGRAM
[X] SUBROUTINE Library
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER________

ANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER________

CATEGORY:
[ ] SYSTEM
[x] UTILITY
[ ] APPLICATION
[ ] OTHER________

UNCTION:

Keyed (indexed) file access

LOCATION / ACCESS PROCEDURE:

Source and ROM on CR 13; must be linked explicitly

XECUTING PROCEDURE / CALLING SEQUENCE:

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: LABLX

AUTHOR: M. Pexton

DATE: Sept. 1979

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[X] APPLICATION
[ ] OTHER

FUNCTION:

Label X-axis on Tektronix CRT screen

LOCATION / ACCESS PROCEDURE:

%GRFP CR19

EXECUTING PROCEDURE / CALLING SEQUENCE:

```
CALL LABLX (XORG, YORG, ISFLG)
 XORG -- X coordinate of origin
 YORG -- Y coordinate of origin
 ISFLG --   -1) Labels below Y-coordinate
            +1) Labels above Y-coordinate
```

DESCRIPTION:

Labels and their tickmarks are generated from the left virtual window border to the right. Intervals of tickmarks and labels are computed according to the current definitions of the CRT virtual window, screen window, and character size.

SOFTWARE DOCUMENTATION

NAME: LABLY

AUTHOR: M. Pexton

DATE: Sept. 1979

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[X] APPLICATION
[ ] OTHER

FUNCTION:

Label Y-axis on Tektronix CRT screen

LOCATION / ACCESS PROCEDURE:

%GRFP CR19

EXECUTING PROCEDURE / CALLING SEQUENCE:

```
CALL LABLY (XORG, YORG, ISFLG)
  XORG -- X coordinate of origin
  YORG -- Y coordinate of origin
  ISFLG -- -1) Labels appear left of X coordi
           +1) Labels appear right of XORG
```

DESCRIPTION:

Labels and their tickmarks are generated from the bottom virtual window border to the top. Intervals of the labels are computed according to the current definitions of the CRT virtual window, screen window, and character size.

OFTWARE DOCUMENTATION

AME: LAXES

UTHOR: M. Pexton

ATE: Sept. 1979

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

ANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[X] APPLICATION
[ ] OTHER

UNCTION:

Draw axes through given point, and label

OCATION / ACCESS PROCEDURE:

%GRFP CR19

XECUTING PROCEDURE / CALLING SEQUENCE: CALL LAXES (XORG, YORG, ISFLGX, ISFLGY)

XORG -- X coordinate of origin
YORG -- Y coordinate of origin
ISFLGX -- -1) Labels below line
+1) Labels above line
ISFLGY -- -1) Labels left of line
+1) Labels right of line

ESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: LOADAD

AUTHOR: Lehman

DATE: 7/1/77

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Same as LOADSP except adds permanent system program.

LOCATION / ACCESS PROCEDURE:

Procedure file is on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: ;LOADAD^ [P1, P2, P3, P4, P5], P6, P7

DESCRIPTION:

See LOADSP.

SOFTWARE DOCUMENTATION

NAME: LOADBG

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: ________________

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER____________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER____________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER____________

FUNCTION:

Same as LOADSP except appends debug utilities.

LOCATION / ACCESS PROCEDURE:

Procedure file is on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: LOADBG [P1,P2,P3,P4,P5],P6,P7

DESCRIPTION:

See LOADSP

SOFTWARE DOCUMENTATION

NAME: LOADMP

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 7/1/77

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Same as LOADSP except includes entire partition in map.

LOCATION / ACCESS PROCEDURE:

Procedure file is on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: : LOADMP [, P1, P2, P3, P4, P5], P6, P7

DESCRIPTION:

See LOADSP.

SOFTWARE DOCUMENTATION

NAME: LOADRP

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 7/1/77

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Same as LOADSP except replaces permanent system program.

LOCATION / ACCESS PROCEDURE:

Procedure file is on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: : LOADRP [, P1, P2, P3, P4, P5], P6, P7

DESCRIPTION:

See LOADSP

SOFTWARE DOCUMENTATION

NAME: LOADSC

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 7/1/77

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Same as LOADSP except uses system common.

LOCATION / ACCESS PROCEDURE:

Procedure file is on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: :LOADSC [,P1,P2,P3,P4,P5], P6, P7

DESCRIPTION:

See LOADSP.

SOFTWARE DOCUMENTATION

NAME: LOADSP

AUTHOR: Lehman

DATE: 7/1/77

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Loads object code residing in one or more object files (or on the LG tracks) using LOADR, saves the resulting load module in a type 6 file on lu 3, and releases the ID segment.

LOCATION / ACCESS PROCEDURE:

Procedure file is on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: : LOADSP [,P1, P2, P3, P4, P5], P6, P7

DESCRIPTION:

P1 through P5 specify the file names of up to 5 object files. If no file names are specified, the current contents of the LG tracks is used.

P6 is the list logical unit for the load map

P7 is the partition number for the resulting program (P7 = 0 implies the program can run in any partition)

SOFTWARE DOCUMENTATION

NAME: LOADSY

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 7/1/77

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
Same as LOADSP except load module is saved on lu 2.

LOCATION / ACCESS PROCEDURE:

Procedure file is on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: :LOADSY [,P1,P2,P3,P4,P5],P6,P7

DESCRIPTION:

See LOADSP

SOFTWARE DOCUMENTATION

NAME: LODER

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: HP

DATE: 9/1/78

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

RTE IV loader

LOCATION / ACCESS PROCEDURE:

Object on CR27 SYSGEN; included as permanent system program after system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:

DESCRIPTION:

See LODSP, LODSY, etc.

SOFTWARE DOCUMENTATION

NAME: LODSEG

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 7/1/77

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Loads object code for segmented program residing in one or more object files (or the LG tracks) using LOADR.

LOCATION / ACCESS PROCEDURE:

Procedure file is on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: : LODSP [, P1, P2, P3, P4, P5], P6, P7

DESCRIPTION:

See LOADSP.

SOFTWARE DOCUMENTATION

NAME: LODSP

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE:

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

LOCATION / ACCESS PROCEDURE:

Loads object code residing in one or more object files using LODER, saves the resulting load module in a type 6 file on lu 3, and releases the ID segment

EXECUTING PROCEDURE / CALLING SEQUENCE:

: :LODSP, P1[,P2,P3,P4,P5,P6,P7]

DESCRIPTION:

1. If the first character of P1 is either "%" or "@", LODSP acts just as LOADSP with a maximum of 5 object files specified in P1 through P5. (P2 through P5 are optional) **P6 is the list logical unit (optional, default=6), and P7 is the partition (optional)

2. If the first character of P1 is not "%" of "@" , P1 is assumed to be a loader command file, P2 thelist logical unit(optional, default=6), and P3 the partition (optional) if P2 through P5 are omitted. P2 and P3 may be changed in the comand file.

3. If p1 is numeric, P1 is assumed to be the logical unit of the user terminal and LODER expects command input from the terminal. P2 through P7 are the same as described in 2 above.

SOFTWARE DOCUMENTATION

NAME: LODSY

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 6/1/78

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Same is LODSP, except load module is saved on lu 2.

LOCATION / ACCESS PROCEDURE:

Procedure file is on lu 2

EXECUTING PROCEDURE / CALLING SEQUENCE:

: : LODSY, P1 [P2,P3, P4, P5, P6, P7]

DESCRIPTION:

See LODSP

SOFTWARE DOCUMENTATION

NAME: MAG

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: M. Pexton

DATE: Sept. 1979

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[X] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[X] APPLICATION
[ ] OTHER

FUNCTION:

Determine magnitude of given number

LOCATION / ACCESS PROCEDURE:

%GRFP CR19

EXECUTING PROCEDURE / CALLING SEQUENCE: I = MAC(xx)
xx -- given real number
Value return is magnitude of number,
i.e. if xx = 1234.5, I = 3
if xx = .012, I = -2

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: MC.ALL

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 8-28-79

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Mounts peripheral cartridges

LOCATION / ACCESS PROCEDURE:

Procedure file resides on Lu2

EXECUTING PROCEDURE / CALLING SEQUENCE:

:MC.ALL

DESCRIPTION:

Mounts cartridges with LU 11 through 27

SOFTWARE DOCUMENTATION

NAME: MDM

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Huntsman

DATE: 3/1/79

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

ounts or dismounts peripheral disc cartridges.

LOCATION / ACCESS PROCEDURE:

Source and object on CR18.

EXECUTING PROCEDURE / CALLING SEQUENCE:

CALL MDM (ICART, MODE)

DESCRIPTION:

MDM checks the status of the requested cartridge, then if appropriate, schedules FMGX o mount or dismount it.

ARGUMENTS:
ICART: Cartridge reference #
MODE: 1=mount, 2=dismount

SOFTWARE DOCUMENTATION

NAME: MEM

AUTHOR: Lehman

DATE: 5/5/77

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Flashes switch register lights.

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27 SYSGEN; included as permanent program at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:

*RU, MEM -or- : SYRU, MEM

DESCRIPTION:

Lowest priority program in system displays light pattern in switch register - can be used to monitor CPU availability in checking for infinite loops, etc.

SOFTWARE DOCUMENTATION

NAME: NEWPG

AUTHOR: ____________

DATE: ____________

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER____________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER____________

CATEGORY:
[X] SYSTEM
[X] UTILITY
[X] APPLICATION
[ ] OTHER____________

FUNCTION:

Clears the screen and positions the beam to the home position

LOCATION / ACCESS PROCEDURE:

Source file on CR 13

EXECUTING PROCEDURE / CALLING SEQUENCE:

Call NEWPG

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: NMLST

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Larson

DATE:

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[X] UTILITY
[X] APPLICATION
[ ] OTHER

FUNCTION:

Allows the user to change the value of a previously defined COMMON variable

LOCATION / ACCESS PROCEDURE:

Source and rom reside on 13

EXECUTING PROCEDURE / CALLING SEQUENCE:

See 58a, 58b.

DESCRIPTION:

See 58a, 58b.

M E M O R A N D U M

DATE: July 31, 1978

TO: HP 21 MX Users

FROM: Wendy Larson

RE: Namelist Subroutine

Subroutine NMLST (ICVAR, INDX, VALU, NUMC, NICVAR) allows the value of previously defined variable in COMMON to be changed. It reads the changes to be made either directly from the user's terminal or from a data file. The variable is then located in COMMON and the value is converted to a numeric value.

ICVAR An array defined in the calling program which contains all the variable names from COMMON. Each variable is expressed as exactly 6 hollerith characters, and is divided into three elements containing two characters each.

INDX An array returned from NMLST containing the index (i) to the ith element in COMMON whose value will be input.

VALU An array returned from NMLST containing the new value to be used. These values are stored in the same order as they were read.

NUMC Returned from subroutine - the number of variables that were read in to be changed.

NICVAR The dimension of ICVAR

All the variable names that may be changed must appear in COMMON. These same variable names must be in the array ICVAR in the same order they appear in COMMON. e.g., COMMON KAC, KSR,.....

```
        .
        .
        .
    DATA ICVAR / 2HKA, 2HC, 2H, 2HKS, 2 HR, ........
```

The new value of the specified value is not assigned to the variable in the subroutine. INDX (K), which is returned from NMLST, tells which element in COMMON will be changed. A series of steps must be set up in the calling program after the call to NMLST which will set the ith (INDX (K) = i) element in COMMON equal to VALU. Assuming the elements in COMMON have been equivalenced to an array, IPARAM or RPARAM, which is dimensioned the same size as COMMON, the steps would be:

```
      DO 10 I = 1, NUMC
      IPARAM (INDX (I)) = VALU (I)
10    CONTINUE
```

If COMMON contains both integer and real variables, an expansion of this code will be required because the COMMON variables will have to be equivalenced to 2 arrays (RPARAM & IPARAM).

Be sure COMMON ITEK (45) is included in the calling program. If the changes are read from a data file, it must be in this form:

```
        VARIABLE NAME = VALUE

e.g.    KAC = 3
        KSR = 1
        *
```

The end of data must be indicated by an "*" in the 1st column.

SOFTWARE DOCUMENTATION

NAME: 02D

AUTHOR: ______

DATE: ______

VERSION:
[x] ORIGINAL
[ ] REVISION

TYPE:
[x] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______

LANGUAGE:
[x] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______

CATEGORY:
[ ] SYSTEM
[x] UTILITY
[ ] APPLICATION
[ ] OTHER______

FUNCTION:

Conversions from octal to decimal

LOCATION / ACCESS PROCEDURE:

Source file on cartridge 13

EXECUTING PROCEDURE / CALLING SEQUENCE:

RU, O2D

DESCRIPTION:

The user is asked to respond with the octal number to be converted. The decimal conversion is then displayed.

SOFTWARE DOCUMENTATION

NAME: OCT

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR:

DATE:

TYPE:

[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:

[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:

[ ] SYSTEM
[ ] UTILITY
[X] APPLICATION
[ ] OTHER

FUNCTION:

Converts user input from decimal to octal

LOCATION / ACCESS PROCEDURE:

Source file on CR 13 (& D20)

EXECUTING PROCEDURE / CALLING SEQUENCE:

RU, OCT

DESCRIPTION:

The program asks for the decimal number to be displayed and then displays the octal conversion for the user.

SOFTWARE DOCUMENTATION

NAME: OFALGL

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 1/15/79

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Releases ID segments of the RTE ALGOL compiler

LOCATION / ACCESS PROCEDURE:

Procedure file is on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

::OFALGOL -or- * RU, FMGR, OF, AL, GL

DESCRIPTION:

Releases ID segments of the RTE ALGOL compiler

SOFTWARE DOCUMENTATION

NAME: OFAP

AUTHOR: Lehman

DATE: 1/15/79

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Releases ID segments of the RTE assembler

LOCATION / ACCESS PROCEDURE:

Procedure file resides on lu 2

EXECUTING PROCEDURE / CALLING SEQUENCE:

: : OFAP -or- * RU, FMGR, OF, AP

DESCRIPTION:

Releases ID segments of the RTE assembler.

SOFTWARE DOCUMENTATION

NAME: OFEDI

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 1/15/79

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Releases ID segments of all possible copies of EDITR created by :EDIT

LOCATION / ACCESS PROCEDURE:

Procedure file resides in lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: :OFEDI -or- * RU, FMGR, OF, ED, I

DESCRIPTION:

Releases ID segments of all possible copies of EDITR created by :EDIT

SOFTWARE DOCUMENTATION

NAME: OFFMG

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 11/15/79

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Releases ID segments of all possible copies of FMGR created by FMG

LOCATION / ACCESS PROCEDURE:

Procedure file resides on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: OFFMG -or- * RU, FMGR, OF, FM, G

DESCRIPTION:

Releases ID segments of all possible segments created by FMG.

SOFTWARE DOCUMENTATION

NAME: OFFTN

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 1/15/79

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER_____________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER_____________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER_____________

FUNCTION:

Releases ID segments all possible copies of FTN4 created by :FORT

LOCATION / ACCESS PROCEDURE:

Procedure file resides on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: :OFFTN -or- *RU, FMGR, OF, FT, N

DESCRIPTION:

Releases ID segments of all possible copies of FTN4 created by :FORT

SOFTWARE DOCUMENTATION

NAME: OTSPL

AUTHOR: Lehman

DATE: 10/1/77

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:
Spools output to line printer

LOCATION / ACCESS PROCEDURE:
Source on CR18; object on CR27 SYSGEN; included in library at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:
CALLOTSPL (LU,KODE)

DESCRIPTION:
Subroutine OTSPL (LU, KODE) allows spooled output the line printer in a non-batch environment.
ARGUMENTS:

LU- the logical unit returned that has been associated with the line printer (negative implies FMGR error on spool file open)

KODE- request code

1. obtain an lu,
2. release the lu,

SOFTWARE DOCUMENTATION

NAME: PACK

AUTHOR: Lehman

DATE: 12/1/76

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Packs system discs.

LOCATION / ACCESS PROCEDURE:
Procedure file resides on lu 2

EXECUTING PROCEDURE / CALLING SEQUENCE:

: : PACK -or- * RU, FMGR, PA, CK

DESCRIPTION:

Does necessary setup, then packs lu 2 and lu 3. Must be executed from FMGR, not a copy.

SOFTWARE DOCUMENTATION

NAME: PLANIT

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Wagner

DATE: 8/79

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[x] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[x] SYSTEM
[x] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Runs SEAMPLAN

LOCATION / ACCESS PROCEDURE:

Procedure file resides on LU2

EXECUTING PROCEDURE / CALLING SEQUENCE:

:: PLANIT

DESCRIPTION:

Mounts cartridges LU 17, 18, 23, then transfers control to SPLAN. Upon completion the cartridges are then dismounted.

SOFTWARE DOCUMENTATION

NAME: PLOP

AUTHOR: Huntsman

DATE:

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Plotter operations procedures

LOCATION / ACCESS PROCEDURE:

Source file resides on CR 13

EXECUTING PROCEDURE / CALLING SEQUENCE:

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: PLOT-10/TCS

AUTHOR: Tektronix/Lehman

DATE:

VERSION:
[ ] ORIGINAL
[X] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Provide software access to Tektronix graphics terminals.

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27 SYSGEN; included in library at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:

DESCRIPTION:

See BMLOC

Subroutine name have been shortened for HP implementation.
Non-essential routines and variables have been eliminated.

OFTWARE DOCUMENTATION

AME: POLY

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: M. Pexton

ATE: Sept. 1979

TYPE:
[ ] PROGRAM
[x] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER________

ANGUAGE:
[x] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER________

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[x] APPLICATION
[ ] OTHER________

UNCTION:

Polygon generator

OCATION / ACCESS PROCEDURE:

%GRFP CR19

XECUTING PROCEDURE / CALLING SEQUENCE: CALL POLY (NPTS, XX, YY ISCALE, INANGLE)

NPTS -- number of endpoints
  >0.) number of polygon corners
  <0.) number of points on STAT figure
XX -- X coordinate of center point
YY -- Y coordinate of center point
ISCALE -- radius length (screen raster units)
IANGLE -- Angle of rotation (degrees)

ESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: PROGS

AUTHOR: Lehman/Huntsman

DATE: 5/1/77

VERSION:
[ ] ORIGINAL
[X] REVISION

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:
Displays current ID segment table.

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27 SYSGEN; included as permanent program at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:
: : PROGS, lu [,1]

DESCRIPTION:
Programs with ID segments are listed on the lu device. If the second parameter is nonzero, segments are also listed.

SOFTWARE DOCUMENTATION

NAME: __PUCMDF__________ VERSION:
[X] ORIGINAL
AUTHOR: __Lehman_______ [ ] REVISION

DATE: ____8/1/77________

TYPE:
[ ] PROGRAM [X] PROCEDURE FILE
[ ] SUBROUTINE [ ] OTHER______________
[ ] FUNCTION

LANGUAGE:
[ ] FORTRAN [X] FMGR COMMANDS
[ ] RELOCATABLE ASSEMBLY [ ] ALGOL
[ ] ABSOLUTE ASSEMBLY [ ] OTHER______________

CATEGORY:
[X] SYSTEM [ ] APPLICATION
[ ] UTILITY [ ] OTHER______________

FUNCTION:

Purges job files created by TTYXX.

LOCATION / ACCESS PROCEDURE:

Procedure file is on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:
: : PUCMDF - or- * RU, FMGR, PU, CM, DF

DESCRIPTION:

Purges the batch job files built by TTYXX

See also TTYXX

SOFTWARE DOCUMENTATION

NAME: PWNDO

AUTHOR: M. Pexton

DATE: Sept. 1979

VERSION:
[x] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[X] APPLICATION
[ ] OTHER

FUNCTION:
SET, CRT screen window proportional to existing virtual window.

LOCATION / ACCESS PROCEDURE:

%GRFP on CR19

EXECUTING PROCEDURE / CALLING SEQUENCE: CALL PWNDO (ISXMIN, ISXMAX, ISYMIN, ISYMAX)

Arguments are the minimum and maximum allowable CRT screen window boundry coordinates.

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: RECOVR

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 6/1/77

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[X] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
Attempts to recover a file lost by a system crash during an edit session.

LOCATION / ACCESS PROCEDURE:
Procedure file resides on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:
: : RECOVR

DESCRIPTION:
The EDITR is repeatedly scheduled using a new LS track each time. If the first line displayed is the file lost, the EC or ER command may recover the file.

SOFTWARE DOCUMENTATION

NAME: REVU

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 2/23/78

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Disc file review.

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27 SYSGEN; load module on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: RU, REVU [,lu[,cr]]

DESCRIPTION:

Names of disc files are singly displayed at which points the contents may be displayed and/or the file may be purged. If "cr" is not specified, the program interrogates the user for the appropriate cartridge refference number. The program is conversational and "HELP" is available.

SOFTWARE DOCUMENTATION

NAME: ______RNDF________

AUTHOR: ____Lehman______

DATE: ____1/9/77__________

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[X] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[ ] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
Random fraction generation.

LOCATION / ACCESS PROCEDURE:
Source on CR18; object on CR27 SYSGEN; included in library at system generation

EXECUTING PROCEDURE / CALLING SEQUENCE:
variable = RNDF (ISEED)

DESCRIPTION:
The real variable will be assigned a random fraction using integer ISEED to generate the fraction. The multiplicative congruential technique is employed.

SOFTWARE DOCUMENTATION

NAME: RNDS

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 1/9/77

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER____________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER____________

CATEGORY:
[ ] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER____________

FUNCTION:

Random fraction generation.

LOCATION / ACCESS PROCEDURE:
Source on CR18; object on CR27 SYSGEN; included in library at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:

CALL RNDS (ISEED, RANDOM)

DESCRIPTION:
The argument RANDOM will be assigned a random fraction using ISEED to generate the fraction. The multiplicative congruential technique is employed.

SOFTWARE DOCUMENTATION

NAME: RTRAK

AUTHOR: Sattoriva

DATE: 8/1/77

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

Release global disc tracks not released by user program.

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27 SYSGEN; load module resides on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: : RU, RTRAK

DESCRIPTION:

Returns global tracks to the system which were held as a result of an EXEC call in an aborted program.

SOFTWARE DOCUMENTATION

NAME: RWNDO

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: M. Pexton

DATE: Sept. 1979

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[x] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[x] APPLICATION
[ ] OTHER

FUNCTION:

Erase CRT screen, outline screen window, and label

LOCATION / ACCESS PROCEDURE:

%GRFP CR19

EXECUTING PROCEDURE / CALLING SEQUENCE:

Call RWNDO

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: SETIM

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: 3/1/78

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Sets system clock

LOCATION / ACCESS PROCEDURE:

Source on CR18; object and CR27 SYSGEN; included as permanent program at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:

: :RU , SETIM

DESCRIPTION:

Interactive question/ response

SOFTWARE DOCUMENTATION

NAME: SPOLU/SLUGT

VERSION:
[ ] ORIGINAL
[X] REVISION

AUTHOR: Lehman

DATE: 10/1/77

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:
Associates logical unit with disc file

LOCATION / ACCESS PROCEDURE:
Source on CR18; object on CR27 SYSGEN; included in library at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:
CALL SPOLU (LU, NAMFL, IOPEN, KODE)

DESCRIPTION:
Subroutine SPOLU allows formatted or binary FORTRAN writes and reads to and from disc. SLUGT is swapped to minimize memory requirements.

ARGUMENTS:

LU- the logical unit returned that is with the disc file (negative implies FMGR error on file open)

NAMFL- integer array containing file name (if the file doesn't exist, it will be created) if IOPEN $\neq$ 2

IOPEN- flag indicating type of open:

1. read/write,
2. read only,
3. write only,

KODE- open/close flag:

1. open,
2. close,
3. close and purge'

OFTWARE DOCUMENTATION

NAME: SRTDL

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR:

DATE:

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Produces a sorted directory listing to a LL file

LOCATION / ACCESS PROCEDURE:

Source file resides on CR 13

EXECUTING PROCEDURE / CALLING SEQUENCE:

RU, SRTDL, LU, LL

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: SVRS

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: CGS

DATE: 6/1/77

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Labeled tape processor

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27 SYSGEN; load module resides on lu 2

EXECUTING PROCEDURE / CALLING SEQUENCE:

: RU, SUVS [,pl[,p2]]

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME:___SVRS___________

VERSION:
[ ] ORIGINAL
[X] REVISION

AUTHOR:__Lehman________

DATE:___10/1/77________

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[X] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[ ] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

LOCATION / ACCESS PROCEDURE:

EXECUTING PROCEDURE / CALLING SEQUENCE:

DESCRIPTION:

SP command implemented to save purged files to mag tape. Syntax identical to SV command.

SOFTWARE DOCUMENTATION

NAME: __SVRS____________ VERSION:
[ ] ORIGINAL
[X] REVISION

AUTHOR: __Lehman________

DATE: ____4/1/78________

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[X] FORTRAN
[X] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[ ] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

LOCATION / ACCESS PROCEDURE:

EXECUTING PROCEDURE / CALLING SEQUENCE:

: ru, SVRS [, p1, p2, f1, f2, f3]

DESCRIPTION:

f1, f2, f3 may be included as the file name (2 characters each) of a disc file containing standard commands. If p2 = 6, all commands produce a form feed and the command is echoed on the line printer.

SOFTWARE DOCUMENTATION

NAME: TABLT

VERSION:
[ ] ORIGINAL
[X] REVISION

AUTHOR: Tektronix/Lehman

DATE: 12/1/78

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER____________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER____________

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER____________

FUNCTION:

Provide access to digitizing tablet

LOCATION / ACCESS PROCEDURE:

Source on CR18; object on CR27 SYSGEN; included in library at system generation

EXECUTING PROCEDURE / CALLING SEQUENCE:

DESCRIPTION:

OFTWARE DOCUMENTATION

AME: TABØ

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR:

ATE:

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

ANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

UNCTION:

Lower level tablet routines

OCATION / ACCESS PROCEDURE:

Source file resides on CR 13

XECUTING PROCEDURE / CALLING SEQUENCE:

See 88a, 88b, 88c, 88d

ESCRIPTION:

These lower level tablet routines include: TBINT, MULPT, ONEPT, TBOFF, TBARM, GETPT.

```
2TABO  T=00004 IS ON CR00018 USING 00022 BLKS R=0161

FTN4,L
C
C*****************************************
C*                                       *
C*  PLOT 10/GRAPHICS TABLET UTILITY ROUTINES  *
C*                  LEVEL 1              *
C*                                       *
C*****************************************
C
      SUBROUTINE TRINT (MAXADR, LOCDSP, IPEN)                    TBINT
      COMMON TMINVX,TMINVY,TMAXVX,TMAXVY,TREALX,TREALY,
     + TIMAGX,TIMAGY,TRCOSF,TRSINF,TRSCAL,TRFACX,TRFACY,
     + TRPAR1,TRPAR2,TRPAR3,TRPAR4,TRPAR5,TRPAR6,KMOFLG(2),
     + KGNMOD,KPADV,KACHAR,KOBLEN,KTRAIL,KLEVEL,KPAD2,
     + KBAUDR,KGNFLG,KGRAFL,KHOMEY,KKMODE,KHORSZ,KVERSZ,KTBLSZ,
     + KSIZEF,KLMRGN,KRMRGN,KFACTR,KTERM,KLINE,KZAXIS,KBEAMX,KBEAMY,
     + KMOVEF,KPCHAR(5),KDASHT,KMINSX,KMINSY,KMAXSX,KMAXSY,KEYCON,
     + KINLFT,KOTLFT,KUNIT,KTBMAX,KTBSND,KTBSEE
      KTBMAX = 0
      KTBSND = 0
      KTBSEE = 0
      IF (MAXADR .NE. 0) KTBMAX = 16
      IF (LOCDSP .NE. 0) KTBSEE = 1
      IF (IPEN .NE. 0) KTBSND = 4
      RETURN
      END
      SUBROUTINE MULPT (NWNT, NGOT, MH, MX, MY)                  MULPT
      DIMENSION MH(NWNT), MX(NWNT), MY(NWNT)
      NGOT = 0
10    CALL TBARM (1)
C
C * INITIALIZE THE PEN DOWN FLAG
C
      IPEN = 0
20    CALL GETPT (IH, IX, IY)
      IF (IH .GT. 63) GO TO 40
C
C * UPDATE THE PEN DOWN FLAG
C
      IF (IH .EQ. 29) IPEN = 1
      IF (IH .GE. 31) GO TO 10
C
```

```
C * DO NOT RETURN THE POINT UNLESS THE PEN IS DOWN
C
      IF (IPEN .NE. 1) GO TO 20
C
C * SAMPLE BRANCH TO BUFFER - FULL ROUTINE FOLLOWS
C
C *   IF (NGOT.GT.NWNT) CALL BUFUL
C
C * DO NOT RETURN MORE POINTS THAN WERE REQUESTED
C
      IF (NGOT .GE. NWNT) GO TO 40
      NGOT = NGOT + 1
      MH(NGOT) = IH
      MX(NGOT) = IX
      MY(NGOT) = IY
      GO TO 20
C30    IF (IH .GT. 63) GO TO 40
C     IF (NWNT .GT. NGOT) GO TO 10
40    CALL TBOFF
      RETURN
      END
      SUBROUTINE ONEPT (IX, IY)                                    ONEPT
10    CALL TBARM (0)
      CALL GETPT (IH, IX, IY)
      IF (IH.GT.31) GO TO 10
      CALL TBOFF
      RETURN
      END
      SUBROUTINE TBOFF                                             TBOFF
      DIMENSION IOUT(2)
      DATA IOUT / 15441B, 36000B /
      WRITE (9) IOUT
      RETURN
      END
      SUBROUTINE TBARM (MULT)                                      TBARM
      COMMON TMINVX,TMINVY,TMAXVX,TMAXVY,TREALX,TREALY,
     + TIMAGX,TIMAGY,TRCOSF,TRSINF,TRSCAL,TRFACX,TRFACY,
     + TRPAR1,TRPAR2,TRPAR3,TRPAR4,TRPAR5,TRPAR6,KMOFLG(2),
     + KGNMOD,KPADV,KACHAR,KOBLEN,KTRAIL,KLEVEL,KPAD2,
     + KBAUDR,KGNFLG,KGRAFL,KHOMEY,KKMODE,KHORSZ,KVERSZ,KTBLSZ,
     + KSIZEF,KLMRGN,KRMRGN,KFACTR,KTERM,KLINE,KZAXIS,KBEAMX,KBEAMY,
     + KMOVEF,KPCHAR(5),KDASHT,KMINSX,KMINSY,KMAXSX,KMAXSY,KEYCON,
     + KINLFT,KOTLFT,KUNIT,KTBMAX,KTBSND,KTBSEE
      DIMENSION IOUT(2)
```

```
      DATA IOUT / 15441B, 0 /
      NPNTS = 32
      IF (MULT .NE. 0) NPNTS = 34
      IOUT(2) = ISL(NPNTS + KTBMAX + KTBSND + KTBSEE, 8) + 32
      WRITE (9) IOUT
      CALL TSEND
      RETURN
      END
      SUBROUTINE GETPT (IH, IX, IY)                                GETPT
      COMMON TMINVX,TMINVY,TMAXVX,TMAXVY,TREALX,TREALY,
     + TIMAGX,TIMAGY,TRCOSF,TRSINF,TRSCAL,TRFACX,TRFACY,
     + TRPAR1,TRPAR2,TRPAR3,TRPAR4,TRPAR5,TRPAR6,KMOFLG(2),
     + KGNMOD,KPADV,KACHAR,KOBLEN,KTRAIL,KLEVEL,KPAD2,
     + KBAUDR,KGNFLG,KGRAFL,KHOMEY,KKMODE,KHORSZ,KVERSZ,KTBLSZ,
     + KSIZEF,KLMRGN,KRMRGN,KFACTR,KTERM,KLINE,KZAXIS,KBEAMX,KBEAMY,
     + KMOVEF,KPCHAR(5),KDASHT,KMINSX,KMINSY,KMAXSX,KMAXSY,KEYCON,
     + KINLFT,KOTLFT,KUNIT,KTBMAX,KTBSND,KTBSEE
      DIMENSION IN(5)
C
C * INPUT THE HEADER
C
      CALL TNSTR (1, IN)
      IH = IN(1)
C
C * CONVERT HEADERS TO CONTROL CHARACTERS WHEN NEEDED
C
      IF (IH .EQ. 77) IH = 29
      IF (IH .EQ. 79) IH = 31
      IF (IH .EQ. 74) IH = 26
C
C * IS HEADER FROM THE KEYBOARD? - BRANCH ON YES
C
      IF (IH .GT. 63) GO TO 30
C
C * IS THERE ANY INPUT LEFT? - BRANCH ON NO
C
      MORE = LFTIO(1)
      IF (MORE .LE. 0) GO TO 30
C
C * IS HEADER FROM THE TERMINAL - BRANCH ON YES
C
      IF (IH .GE. 31) GO TO 30
C
C * IS TABLET SENDING 12 BITS? - BRANCH ON YES
```

```
C
      IF (KTBMAX .NE. 0) GO TO 10
C
C * INPUT AND CALCULATE 10 BIT TABLET ADDRESS
C
      CALL TNSTR (4, IN)
      IX = (IN(3) - 32)*32 + IN(4) - 32
      IY = (IN(1) - 32)*32 + IN(2) - 32
      GO TO 40
C
C * INPUT AND CALCULATE 12 - BIT TABLET ADDRESS
C
10    CALL TNSTR (5, IN)
      IX = (IN(4) - 32)*128 + (IN(5) - 32)*4 + MOD(IN(2),4)
      IY = (IN(1) - 32)*128 + (IN(3) - 32)*4 + MOD(IN(2)/4,4)
      GO TO 40
C
C * INPUT AND CALCULATE TERMINAL STATUS ADDRESS
C
C20     CALL TNSTR (4, IN)
C     IX = (IN(1) - 32)*32 + IN(2) - 32
C     IY = (IN(3) - 32)*32 + IN(4) - 32
C     GO TO 40
C
C * NO ADDRESS INPUT OR CALCULATION IS NEEDED
C
30    IX = 0
      IY = 0
40    RETURN
      END
$
```

SOFTWARE DOCUMENTATION

NAME: TICK

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: M. PEXTON

DATE: Sept. 1979

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER________

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[X] APPLICATION
[ ] OTHER________

FUNCTION:

Draw a tickmark at current CRT beam location

LOCATION / ACCESS PROCEDURE:

%GRFP CR19

EXECUTING PROCEDURE / CALLING SEQUENCE: CALL TICK (ANGLE, LENGTH)

Angle -- Angle of line the tickmark is to bisect (radians)

Length -- Total length of tickmark (screen raster units)

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: TIME

AUTHOR: Lehman

DATE: 12/1/76

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[ ] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
Displays current time and date

LOCATION / ACCESS PROCEDURE:
Source on CR18; object on CR27 SYSGEN; included as permanent program at system generation

EXECUTING PROCEDURE / CALLING SEQUENCE:
(*:) RU, TIME [,lu[,-1]]

DESCRIPTION:

The current time in hours, minutes, seconds and AM/PM as well as the date is displayed on the specified lu. If -1 is included in the command string, carriage return/line feed is suppressed.

SOFTWARE DOCUMENTATION

NAME: TRACK

AUTHOR: Lehman

DATE: 2/1/77

VERSION:
[X] ORIGINAL
[ ] REVISION

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[X] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:
Displays assigned tracks.

LOCATION / ACCESS PROCEDURE:
Source on CR18; object on CR27 SYSGEN; included as permanent program at system generation

EXECUTING PROCEDURE / CALLING SEQUENCE:

(* :) RU, TRACK [,lu]

DESCRIPTION:

Displays current track assignment table on lu.

SOFTWARE DOCUMENTATION

NAME: TTY9

VERSION:
[ ] ORIGINAL
[X] REVISION

AUTHOR: Lehman

DATE: 3/20/78

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER______________

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER______________

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER______________

FUNCTION:

LOCATION / ACCESS PROCEDURE:

EXECUTING PROCEDURE / CALLING SEQUENCE:

DESCRIPTION:

If "UC" is entered as the <u>first</u> command, the teletype will become (or remain) the system console.

SOFTWARE DOCUMENTATION

NAME: __TTY9/TTY10______ VERSION:
[ ] ORIGINAL

AUTHOR: __Lehman________ [X] REVISION

DATE: ____8/1/77________

TYPE:
[X] PROGRAM [ ] PROCEDURE FILE
[ ] SUBROUTINE [ ] OTHER____________
[ ] FUNCTION

LANGUAGE:
[X] FORTRAN [ ] FMGR COMMANDS
[ ] RELOCATABLE ASSEMBLY [ ] ALGOL
[ ] ABSOLUTE ASSEMBLY [ ] OTHER____________

CATEGORY:
[X] SYSTEM [ ] APPLICATION
[ ] UTILITY [ ] OTHER____________

FUNCTION:
Allows online operation of batch processor.

LOCATION / ACCESS PROCEDURE:
Source on CR18; object on CR27 SYSGEN; included as permanent programs at system generation.

EXECUTING PROCEDURE / CALLING SEQUENCE:

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: WELCOM

VERSION:
[ ] ORIGINAL
[X] REVISION

AUTHOR: Lehman

DATE: 9/1/77

TYPE:
[ ] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[x] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[ ] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[X] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[X] SYSTEM
[ ] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:

Initialize system following bootstrap

LOCATION / ACCESS PROCEDURE:

Procedure file resides on lu 2

EXECUTING PROCEDURE / CALLING SEQUENCE:

Schedule automatically by FMGR at bootstrap

DESCRIPTION:

Initializes terminal and line printer, insures a copy of EDITR and FMGR for each terminal.

SOFTWARE DOCUMENTATION

NAME: XDRW

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: M. Pexton

DATE: Sept. 1979

TYPE:
[ ] PROGRAM
[X] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[ ] UTILITY
[X] APPLICATION
[ ] OTHER

FUNCTION:

Draw an "X" through current point of CRT beam

LOCATION / ACCESS PROCEDURE:

%GRFP CR19

EXECUTING PROCEDURE / CALLING SEQUENCE: CALL XDRW (ISIZE)

ISIZE -- Size of the "X" (screen raster units)

DESCRIPTION:

SOFTWARE DOCUMENTATION

NAME: XEXTS

VERSION:
[X] ORIGINAL
[ ] REVISION

AUTHOR: Lehman

DATE: ~~11/1/77~~

TYPE:
[X] PROGRAM
[ ] SUBROUTINE
[ ] FUNCTION
[ ] PROCEDURE FILE
[ ] OTHER

LANGUAGE:
[X] FORTRAN
[ ] RELOCATABLE ASSEMBLY
[ ] ABSOLUTE ASSEMBLY
[ ] FMGR COMMANDS
[ ] ALGOL
[ ] OTHER

CATEGORY:
[ ] SYSTEM
[X] UTILITY
[ ] APPLICATION
[ ] OTHER

FUNCTION:
File extent truncation

LOCATION / ACCESS PROCEDURE:
Source on CR18; object on CR27 SYSGEN; load module resides on lu 2.

EXECUTING PROCEDURE / CALLING SEQUENCE:

:: RU, XEXTS [,lu[,cr]]

DESCRIPTION: Each type 3,4, or 5 file with extents on the cartridge whose reference number is "cr" will be consolidated into a file of the same name with no extents. If "cr" is not specified, the user is interrogated for the appropriate cartridge reference number.